

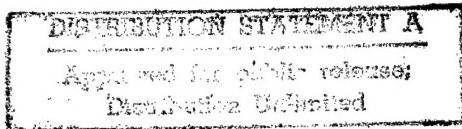
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JPRS-UST-85-015

22 November 1985

USSR Report

SCIENCE AND TECHNOLOGY POLICY



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**USSR REPORT
SCIENCE AND TECHNOLOGY POLICY**

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ORGANIZATION, PLANNING AND COORDINATION

DISCIPLINE PROBLEMS AT UZBEK INSTITUTE OF PHYSIOLOGY

Tashkent PRAVDA VOSTOKA in Russian 10 Apr 85 p 3

[Article by PRAVDA VOSTOKA correspondent A. Tankhelson: "Equability Out of Inertia"]

[Text] At the annual assembly of the Uzbek SSR Academy of Sciences (March 1985) it was stated: at the Institute of Physiology in 1984 7 kopecks were obtained per ruble of expenditures--the lowest indicator among the subdivisions of the republic academy. What is behind it? This question also prompted the editorial board to send a correspondent to the institute in order to investigate on the spot the causes of such pitiful results.

Thus, 8:30 in the morning is the time of the start of work at the institute.

It is difficult to understand whom Nuriya Chekusheva, an inspector of the Personnel Division of the Institute of Physiology, was trying to deceive: her managers, me or herself. However, she tried to be misleading. But nothing came of this. It was clarified from the first minutes of our laconic dialogue.

To the question "How many people were late to work today?" Nuriya answered briskly: "Three." But meanwhile in the "channel" of the narrow cul-de-sac, which is closed off by the institute's gate, more than half of the associates came not by 8:30, by 15, 20 and even 30 minutes later. Rustam Khidyraliyevich Irgashev, acting deputy director of the institute, also spoke about this--frankly and not hypocritically.

But we will not be formalists. Science is science. Here one does not need to take time into account. Perhaps, someone, who got carried away by and engulfed in an experiment, stayed late at the laboratory? It turns out: nothing of the sort happened the day before with all who were late. Then how is one to explain the fact of such mass tardiness? Only by the lack of proper discipline and the absence of supervision.

Rustam Khidyraliyevich has been working here a little more than a week. And the old customs obviously are not to his liking as a fresh man. Just as they are not to the liking of Bekzhan Aybekovich Tashmukhamedov, the new director of the institute, who was also approved in this position quite recently.

Of course, it is difficult to eradicate in one stroke what is old and has settled in the consciousness of people over many years. That is why the new managers, who are busy with the solution of many difficult problems, from the first days must not lose sight of the questions of planning, executive and labor discipline and must perform constant, serious, strictly differentiated work with personnel at all levels. The success of the common cause in many respects will depend on this work, which is directed at the uniting of the collective and is aiming it at the optimum solution of all problems. If you neglect this work today, tomorrow, perhaps, you will catch up, but with great costs. In other words: as you sow, so shall you reap.

In this sense everyone, who was in the office of the director on the day of the check of the "attendance rate," was taught a lesson: the deception of the worker of the Personnel Division, who is called upon to watch over order and discipline, is nothing but the inertia of the old, the notorious struggle for the honor of the uniform, vanity and the aspiration no matter what not to wash dirty linen in public. Such, if one may say so, passages might only offend a genuine scientist. A scientist, who realizes his lofty purpose and truly has the cause at heart, does not need such "reprimands." Turgun Abdukayumovich Mansurov, secretary of the party organization of the institute, who was present during our conversation, should ponder this thoroughly. The attention of the communists and the entire collective should be attracted precisely to this thought. It should be the basis for many measures of the party and trade union organizations.

The increase of the overall level of the quality of research and development, as was indicated at the 26th CPSU Congress, is the main means of the further increase of the efficiency of science. The novelty, promise and importance of developments and their economic impact from use in the national economy should be an indispensable criterion in case of the evaluation of the activity of a scientific research institution.

Even in case of brief acquaintance with one of the plans of the introduction of the results of scientific research in the national economy you come to the conclusion that this section of the work is here in an extremely neglected state. In the document (which is date 1985) the name of the job, its brief description, the amount, the place of introduction and the anticipated economic impact are indicated. Only the most important column for the specific date of introduction is absent. Specific dates are also not indicated in the plan of the conducting of pilot production tests (checks) of scientific and technical developments.

Gloomy conclusions suggest themselves: a formal attitude toward the matter is incorporated in the very form of the reporting documents.

"But did you not try to do away with such forms? For are the result of a job and its introduction the main thing, for the sake of which it was done?" I ask

Scientific Secretary and Candidate of Biological Sciences Tatyana Fedorovna Yurasova.

"Previously they did not require this of us," followed the reply. "Now they have begun to require reports on introduction for every quarter. Now we are reporting."

Thus a copy of the report of one laboratory for the first quarter of 1985 got into my hands. I will quote it word for word:

"Report. On the progress of the fulfillment of the plan of introduction for the first quarter of this year. The Laboratory of Ecological Physiology in 1985 is not planning the introduction in practice of the results of research, since starting in 1984 it began research on a new theme and does not yet have sufficient data for this.

"The previously conveyed recommendation on the use of chlorella paste in mink breeding at present is at the stage of study in the Department of Fur Farming of Uzbekbrlyashu [not further identified]. The joint discussion of this question with the management of Uzbekbrlyashu is planned in the immediate future (15 April 1985). Chief of the Laboratory of Ecological Physiology Kh. Khayruttinov. 1 April 1985."

It should be added to this document that they began working on the theme "The Use of Chlorella in Mink Breeding" back in 1975, but so far a development has not been introduced. Why? In the opinion of production workers, its most vulnerable spot is the lack of approved economic evidence for use. But from the very start it was intended precisely for farms which raise mink.

But let us return to today. Among those who were late there was also "a senior scientific associate without a degree," as was indicated in the manning table, one Ya. G. Rybalskiy. In reality he is merely registered at the institute. He comes here only on payday, but works in the united trade union committee of the presidium of the academy. I attempt all the same to ascertain what he has to do with biology in general and physiology in particular. Candidate of Biological Sciences Salomat Zufarovna Mirtursunova satisfies my curiosity:

"He is by profession an athlete."

Such is the "physical culture greeting" for you.

At the 19th Uzbek CP Central Committee Plenum it was stressed that the policy of eradicating shortcomings should permeate the activity of every party organization and every labor collective and all the social units of our society. And the party organization of the institute must eradicate more resolutely equability, complacency, philistinism and irresponsibility-- everything that led in the end to the notorious "7 kopecks" in a comparatively small collective, in which, incidentally, of the 127 people now working 9 are doctors of sciences and 15 are candidates of sciences.

A month has not passed since the "united meeting of the party organization and the heads of the laboratories of the Institute of Physiology of the Uzbek SSR Academy of Sciences," which is memorable here and at which the serious oversights in many units of the work were revealed. It is permissible to ask what effect this meeting had in the collective, if many people both were late previously and are late today, if "the scientific directions of the Institute of Physiology of the Uzbek SSR Academy of Sciences to 2000," which in essence are the basic document for the long-range future, are nine typed lines which are vague in content.

Our conversation ended in the new building which was set aside for the institute, which for the present is located in five places. A house warming is planned here in April, and the entire collective will be gathered "under one roof." The prospect for putting the matter in order is good. But order still must be established in the old walls.

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CSO: 1814/143

LATVIAN ACADEMY PRESIDENT ON REPUBLIC SCIENTIFIC ADVANCES

Riga SOVETSKAYA LATVIYA in Russian 20 Apr 85 p 2

[Article by Corresponding Member of the USSR Academy of Sciences and President of the Latvian SSR Academy of Sciences B. Purin: "Speeding Up the March of Progress"]

[Text] The party has posed a task of enormous political importance--to bring the national economy up to a qualitatively new scientific and technical and organizational economic level. The scientists of the republic have taken as a guide to action the directive of the March (1985) CPSU Central Committee Plenum--to attain the most advanced scientific and technical positions. Such a large-scale task is a mobilizing stimulus in the activity of scientific collectives and in their competition for a worthy greeting of the 27th CPSU Congress.

Scientific schools, which have received extensive recognition in the country and abroad, have been formed in Soviet Latvia. The Academy of Sciences, which was founded in 1946, is the leading center of science. There are included in it 15 scientific research institutes, 3 experimental plants and 6 cost accounting special design bureaus. In a number of directions of basic and applied research the Latvian SSR Academy of Sciences has achieved leading positions in the country.

The research and development, which have been conducted by our scientists in the area of the magnetohydrodynamics of incompressible media, in particular, are unique. The results of such theoretical research not only gave new ideas about the structure of the Earth and other celestial bodies and about the Gulf Stream current, but also made it possible to solve a large number of technical problems. Magnetohydrodynamic pumps for the pumping of molten metals, devices for the stirring of aluminum during its production and a new technology of the production of ultrapure mercury were developed.

Practically all the academic institutes are carrying out extensive cooperation with production. I will cite several examples. The theoretical principles of the reinforcement, filling, deformation and destruction of polymers and composites were formulated at the Institute of Polymer Mechanics. On the basis of this research more than 50 new instruments for the nondestructive

checking and prediction of the strength of components and items made from polymeric and composite materials were designed and introduced in industry.

As is known, scientific and technical progress during the next decade will be governed by the radical change of the structure of fuel and energy resources. In this connection the developments of the Physics and Power Engineering Institute, which are aimed at the optimization of power networks and the use of secondary energy resources, are assuming great importance.

I would like to note the research and development on computer networks. A unified network of computers is already operating in the academy. The uniting of the computers of five institutes into a unified system enabled scientists to use the consolidated potential of computer capacities. At the Institute of Electronics and Computer Technology the work on the development of a network of electronic computers for the needs of the entire Soviet Baltic region is being completed.

The achievements of the microbiology scientists of Latvia are indisputable.

All the plants of the country, which produce citric acid, are operating in accordance with the biotechnology of obtaining citric acid, which was developed at the experimental plant of biochemical preparations of the Institute of Microbiology imeni A. Kirkhenshteyn. In accordance with this technology 20-30 percent more final product is obtained than in case of the use of the best foreign technologies. Seven license agreements for the use of this technology have been concluded.

When speaking about the achievements of chemistry in the Latvian SSR, it is first of all necessary to note the Institute of Organic Synthesis of the Latvian SSR Academy of Sciences, which is well known for the purposeful search for new biologically active compounds on the basis of basic research in the area of bioorganic chemistry, molecular biology and genetic engineering. In recent years this institute has developed over 60 medicinal preparations and 15 preparations for agriculture. In recent years products worth more than 150 million rubles have been produced in accordance with the developments of the Institute of Organic Synthesis in the system of the Ministry of the Chemical Industry and the Ministry of the Medical Industry. A number of preparations, such as, for example, the antitumor preparation fluorafur, which was synthesized at this institute, are being exported to many countries of the world.

The contribution to production of the collective of the Institute of Wood Chemistry, by whose efforts a efficient technology of obtaining a valuable product--furfural, which is obtained from deciduous wood--was developed and introduced at enterprises of the country, is significant. The new technology made it possible to increase the output of furfural by 20-25 percent as compared with the world level. The construction of the Zilayskalns Pilot Industrial Plant in Valmiyerskiy Rayon for the production of nutrient yeast and molasses from younger peat is being completed. The Institute of Wood Chemistry developed the technology of this production.

A technology of the plasma chemical synthesis of refractory compounds and their composites in the form of dispersed powders of high purity was developed on the basis of the basic research in the area of plasma chemistry, which was conducted at the Institute of Inorganic Chemistry. The method of the plasma spraying of corrosion-proof and wear-resistant coatings has an important practical application. In the Latvian SSR sections for the repair of parts of agricultural, road and construction machinery by this method have been set up in the system of the State Committee for the Supply of Production Equipment for Agriculture and the Ministry of Construction.

Serious tasks face the academy. Undoubtedly, it is necessary to further develop at a high theoretical level the basic research in the basic scientific directions which were specified for the republic academy by the Presidium of the USSR Academy of Sciences. However, applied research should make a more significant contribution to the acceleration of scientific and technical progress in the country, moreover, it is necessary to increase the proportion of the introduction of the achievements of science in the national economy of the republic. The Academy of Sciences has not carried out actively enough the coordination and concentration of all the scientific forces of the republic for the acceleration of scientific and technical progress in the decisive sectors of the national economy.

At present new republic goal programs are being formulated at scientific research institutes jointly with the departments of the Latvian SSR State Planning Committee. Large scientific research and pilot industrial complexes, within which the cooperation of the institutes of the academy with higher educational institutions and sectorial scientific research organizations is being organized, are undergoing further development on the basis of these programs.

It is possible to cite several examples of such complexes. Thus, the Institute of Microbiology, the Institute of Wood Chemistry and the Institute of Biology of the Latvian SSR Academy of Sciences, higher educational institutions, sectorial scientific research organizations, the pilot plants of the academy, the fodder production complex at the Uzvara Kolkhoz (Bauskiy Rayon) and the experimental biotechnical complex of the Ogre Sovkhoz are taking part in the development of new biotechnologies. The efforts of the Institute of Organic Synthesis and its experimental plant, higher educational institutions, sectorial scientific research organizations and the Biolar and Olainfarm scientific production associations are being united for the development of new medicinal preparations and means for agriculture.

It is necessary to note that the problem of coordinating scientific research and pilot industrial operations in the republic has its own difficulties. The academy, higher educational institutions and sectorial institutes have a different departmental subordination. Enterprises, scientific production associations and scientific research and planning and design organizations of union subordination take up a large share in the republic. Therefore, it is necessary to continue the search for the most effective forms of the activity of such scientific research and pilot industrial complexes. The special-purpose financing of the program of operations of the complex with the right

of the main organization to distribute assets to coperformers might become one of the means of solving this problem.

The design and pilot industrial base of the academy is playing an important role in the increase of the efficiency of the activity of the institutes and the speeding up of the use of completed scientific research in the national economy. It is quite obvious that without the chain institute--special design and technological bureau--pilot works it is impossible in a short time to bring the results of laboratory research to extensive practical use.

The institutes of the Chemical and Biological Sciences Department of the academy have their own specialized experimental bases. Owing to the joint activity of the institutes with these subdivisions large-scale developments have become decisive not only for scientific and technical progress in the republic, but also for a number of sectors of the national economy in the Soviet Union. It is necessary in the future as well to strengthen these bases and to improve their activity.

One of the urgent and so far unsolved problems is the shortage of work areas, especially for the Special Design and Technological Bureau of Inorganic Materials and the Special Design and Technological Bureau of the Protection of Metals Against Corrosion, which is being set up. A difficult situation has formed with the experimental bases of institutes of the physical technical type. The majority of experimental sections of the Special Design Bureau of Magnetohydrodynamics, the center of robotics (the Institute of Physics) and the Special Design Bureau of Scientific Instrument Making (the Institute of Polymer Mechanics) are dispersed about Riga and are located in premises which are unsuitable for experimental operations.

Such scientific directions as semiconductor technology (the Physics and Power Engineering Institute) and computer networks (the Institute of Electronics and Computer Technology) are unsatisfactorily supplied with pilot bases. All this had the result that the experimental base of the institutes of the Physical and Technical Sciences Department is capable of producing only single prototypes of developed new unique tools and equipment. However, small series of new instruments are necessary for the republic and a number of sectors of technology. If a special design bureau begins to produce a series of instruments of one type or another, it is not capable of rapidly implementing new developments in the form of prototypes, which greatly hinders the further development of research and its practical implementation.

In this connection it would be useful to turn to the idea advanced by President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton. It is a question of the establishment under the Academy of Sciences of so-called engineering centers. Probably, for the present it is sufficient for our academy to organize under the Physical and Technical Sciences Department only one such engineering center on the basis of an academy-wide cost accounting design bureau with a pilot works and the already existing center of robotics. Such concentration, undoubtedly, will make it possible to increase the scale of development and to set up the production of small series of new equipment with respect to not only our academic institutes and their special design bureaus, but also higher educational institutions of the republic.

And the last, but very significant circumstance, which in many respects governs today the pace of the introduction of the achievements of science in production. The development of our experimental base is directly connected with the implementation of the plans of capital construction. In past years they were fulfilled, as a rule, within the limits of 40-50 percent. And a decisive change occurred in this matter only in 1984, for which we are very grateful to the republic Ministry of Construction. I would like for this positive trend to be firmly consolidated in the future. The construction projects of science require the most serious attention.

The scientists of the republic are attaching great importance to the further strengthening of their ties with the needs of production and to the increase of the economic and social role of these ties in the successful accomplishment of the tasks posed by the party. In greeting the 27th CPSU Congress and the 40th anniversary of the Great Victory, every scientist is fully resolved to increase his contribution to the strengthening of the economic might of our country and to ensure its achievement of the most advanced scientific positions.

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CSO: 1814/143

STIMULATION OF INTEREST IN SCIENTIFIC, TECHNICAL PROGRESS

Moscow SOTSIALISTICHESKIY TRUD in Russian No 2, Feb 85 pp 31-37

[Article by Candidate of Economic Sciences A. Dolgova: "Effective Stimuli of Acceleration for the Intensification of Production"]

[Text] The party and government regard the acceleration of scientific and technical progress not only as a decisive means to increase significantly the well-being and the cultural and spiritual growth of the workers, to facilitate their working conditions and to strengthen the defensive capability of the country, but also as one of the main directions of the competition between the socialist and capitalist systems.

It should be noted that our country in a historically short time achieved a leading level of scientific and technical progress. The USSR was the first in the world to break into space. Soviet scientists developed the laser, and its industrial use was begun for the first time in our country. The Soviet plants for the continuous teeming of steel, the welding methods, which are being developed under the supervision of Academician B. Paton, and others are known worldwide. Annually 3,500-3,700 new types of items are developed and assimilated in production in our country. Here the share of products of the highest quality category in their total production volume is constantly increasing.

In recent times the introduction of the most advanced types of new machinery and equipment has sped up. Thus, since the beginning of the current five-year plan the production of microprocessors has increased by nearly fivefold, while the production of microcomputers has increased by more than twofold. Nearly as many automated systems for the control of technological processes have been developed as during the entire 10th Five-Year Plan. All this made it possible in 1983 alone to save the labor of over 600,000 people and to create the prerequisites for the decrease of the share of difficult physical and manual labor, which for the present is still quite significant.¹

However, the implementation of the achievements of science and technology for the present still does not conform to the tasks of the acceleration of the intensification of social production. The stock of equipment is being updated at an inadequate pace with new machinery. Thus, during the past decade, for example, in the year of the development of new models of machines 20 percent

of them were turned over to production, for the second year--30 percent, for the third year--18 percent, while the production of the remainder was postponed to a subsequent period.²

Along with this the introduction of new equipment was accompanied by an increase of the expenditures, which per measure for industry as a whole increased during the period of 1976-1983 by 12.7 percent, while the economic impact, according to the testimony of Chairman of the State Committee for Science and Technology G. I. Marchuk, per ruble of expenditures for the national economy in the past 10 years decreased somewhat.³

The formed situation in this area is explained first of all by the inadequate interest of enterprises and organizations in the development, introduction and assimilation of more advanced equipment. In this connection a vital task faces economic science: to develop an effective mechanism of the stimulation and management of scientific and technical progress and to provide within it advantages to the collectives and workers, who boldly introduce new equipment and advanced technology. The decree of the CPSU Central Committee and the USSR Council of Ministers of 18 August 1983 "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" is also aimed at this.

The main goal is to ensure in the next few years the significant increase of product quality, the acceleration of the introduction of advanced technological processes and, on this basis, the substantial increase of labor productivity in the national economy.

Among the envisaged measures one should first of all note the decision on the changeover starting in 1985 of the associations, enterprises and organizations of a number of sectors of the national economy (agriculture, construction, transportation, communications, geology, material and technical supply) by analogy with industry to the cost accounting system of the organization of operations on the development and introduction of new equipment. The principles of this system were tested for more than 10 years in individual industrial ministries and showed its quite great efficiency. Thus, in the Ministry of the Electrical Equipment Industry, in which the cost accounting system of the stimulation of work on new equipment has existed since 1969, the highest level of product quality for industry was achieved: the proportion of products of the highest quality category in the total production volume of this sector in 1983 came to 48 percent.

The merit of the indicated system consists in the aim of the incentive at the ultimate achievements of scientific and technical progress and at the connection of the incentive of workers with the real economic impact which was obtained as the result of the introduction of new equipment both "at one's own place" (at the producer's) and "on the side" (at the user's). This is achieved first of all by a special system of the formation of economic stimulation funds by means of two main sources: the first is the deductions from the profit which is formed at enterprises due to the actual decrease of the product cost as a result of the use of new equipment; the second is the deductions from the additional profit which was actually obtained due to incentive markups on the wholesale prices for new highly efficient products,

which conform in their parameters to the best domestic and foreign models, and for products with the State Emblem of Quality.

Thus, the ultimate achievements in the area of scientific and technical progress (the release of personnel, the decrease of the materials-output ratio, the production of high quality products), which are implemented at enterprises, are linked with the amount of the incentive funds: the greater the results are, the more assets are deducted for the corresponding funds.

If we examine as a whole the dynamics of the incentive assets, which were channeled into the funds for the payment of bonuses to workers of industry for new equipment, in 7 years their amount increased both in absolute terms (by 42.3 percent in 1983 as compared with 1976) and by 0.4 percent with respect to the material incentive funds of enterprises (from 6.2 percent in 1976 to 6.6 percent in 1983). Moreover, the largest increase of these assets was during the first years of the changeover to the new conditions of stimulation for new equipment. However, the use of these great assets did not yield the proper return. It is well known that during the 10th Five-Year Plan, as well as in 1981 and 1982 the assignments on the increase of labor productivity and the decrease of the product cost were not fulfilled.

The factor analysis of the increase of labor productivity, which was made in accordance with the results of 1980 and 1981 on the basis of the example of 15 enterprises of various sectors of industry, showed that the most significant share of its increase at half of them was provided no by the technical improvement of production, but by measures of the scientific organization of labor, the implementation of which, as a rule, does not require large expenditures. As a whole for industry 68.1 percent of the increase of labor productivity was provided in 1982 by the scientific organization of labor. As to the measures on the technical improvement of production, new equipment provided over 50 percent of the increase of labor productivity at only 30 percent of the examined enterprises.

The low efficiency of the equipment being introduced and its incomplete use do not make it possible to increase significantly the technical and economic indicators of the activity of enterprises. To a certain extent this is also explained by the fact that the collectives of scientific research institutes and design bureaus in pursuit of an instantaneous result give preference to developments which are minor, but are more reliable from the point of view of the time of introduction and the obtaining of an impact. Life requires that stimulation promote more the performance of major, promising operations.

Here it should be borne in mind that the expenditures per introduced measure on new equipment in 1983 as compared with machine building were 3.1-fold greater at enterprises of other sectors of industry and accordingly 2.2-fold greater per conditionally released worker. This point is that in such sectors as ferrous metallurgy, the chemical, petrochemical and petroleum refining sectors and others, in which equipment processes predominate and, consequently, the level of automation of basic production is high, the freeing of each worker requires large expenditures and it is comparatively more difficult to accomplish it than at machine building enterprises.

At the same time in spite of the different possibilities of sectors in obtaining a saving from new equipment, the standards of the deductions of assets with respect to the first source are approximately equal (within the range of 11-16.5 percent of the annual economic impact). In this connection, in our opinion, it is advisable with allowance made for the sectorial peculiarities of enterprises to increase the maximum level of the standard of the deduction of assets with respect to the first source and within sectors to differentiate these standards, giving preference to major, promising operations.

In this respect the practice of the Ministry of the Chemical Industry, in which all developments are broken down into three groups subject to their scientific and technical level: those which in their parameters exceed the best domestic and foreign achievements, those which correspond to the best domestic and world models, and those which according to their technical and economic indicators cannot be assigned to the first two groups, merits attention. The standards of the incentive are differentiated as applied to the indicated groups within the range of 22-7 percent. As a result in the 4 years of work of the sector under these conditions the number of developments corresponding to the world level increased by 54 percent, owing to which the economic impact increased by nearly 80 percent.

In our opinion, it would be advisable to envisage the following scale of the differentiation of the standard:

--for the development, assimilation and introduction of new technological processes, which exceed in the most important technical and economic indicators the world level, to increase the unified standard of the incentive by 50 percent (the same thing with respect to the improvement of operating ones with a similar result);

--for operations on new equipment, which are performed in conformity with all-union scientific and technical programs, and the development, assimilation and introduction of technological processes, which correspond in their technical and economic indicators to the world level, to increase the standard by 25 percent;

--for technological processes and decisions, which are not inferior to the best domestic models, to use the established standard;

--for other developments to decrease the standard by 50 percent.

The deductions from the additional profit, which was obtained due to the incentive markups on new highly efficient products and products with the Emblem of Quality, is the second, more impressive source (16-25 percent of the material incentive fund). From this source the producer enterprise receives a portion of the assets which were saved by users as a result of the introduction of new equipment. As a whole the system of incentive markups on high quality products is playing a positive role in the increase of the technical level of production.

At the same time the data, which characterize the breakdown of items of the highest quality category by years of their placement into series production, show that the tendency for the output of not qualitatively new, more advanced equipment, but modernized equipment, which is based on existing, at times obviously obsolete technical decisions, to increase remains. Thus, in 1981 about 60 percent of the products awarded the highest quality category in machine building and 80 percent in other sectors of heavy industry were assimilated before 1976 (that is, 8 years and more ago).

This attests that the system of stimulation for the present does not interest enterprises in the substantial updating of the output being produced. And, apparently, just the mechanism of incentive markups is still insufficient here, although the role of the latter will increase in connection with the increase of their maximum amounts to 30 percent of the wholesale price, or by nearly twofold.

The improvement of the technical and economic characteristics of products is of great importance. At present the ratio between the economic impact and the wholesale price of an item, which should be not less than 0.15:1, is the main criterion of the determination of the amounts of the incentive markups on the prices for products of the highest quality category. Here its technical level does not affect the amount of the markup. At the same time inefficient products (with a ratio of the impact to the price of less than 0.15:1), on the prices for which incentive markups are not established, can also be assigned to the highest quality category. As a result, according to the data of the State Committee for Science and Technology, about 80 percent of the products with the State Emblem of Quality do not have incentive markups. As compared with machine building in the other sectors of heavy industry their relative amounts are one-tenth to one-eighth as great.

Along with the indicated reasons incentive markups on products with the Emblem of Quality are also absent due to the fact that in these and frequently in machine building ministries they are intermediate products which are intended for making up items which do not have incentive markups. This situation to a certain extent gives rise to the problem of "surplus" quality. The point is that the enterprises which are the producers of intermediate products, frequently being guided not by the specific demands of the user, but by the assignments of superior organs, expand the production of technically more advanced items which require additional expenditures, without receiving the appropriate compensation for this. The user, in purchasing them at comparatively inexpensive prices (without incentive markups), uses these items without obvious necessity, without bearing any economic liability for this.

It seems to us that such a procedure should be established, when products, which have a difference between the economic impact and the wholesale price of not less than 15 percent, can be assigned to the highest quality category. The conditions would thereby be created so that incentive markups could be established for the entire final product for production engineering purposes, which has been certified as being of the highest quality category.

As to the increase of the quality of intermediate products (pig iron, construction materials, motors and so on), here, so it seems to us, it is

necessary to increase the responsibility of the user enterprise on the basis of delivery contracts, in which it is necessary to indicate, items of what quality category are required. Since products of the highest quality category will be delivered in consultation with the user, the latter should pay the markups either by means of its own incentive funds or by means of the centralized fund for the payment of bonuses for new equipment of the ministry. Otherwise the user should draw up orders for the production of products of only the first quality category.

For the greater effectiveness of the stimuli to improve the quality of items it would be advisable to introduce the differentiation of the incentive markups on the prices for highly efficient products not only subject to the amount of the economic impact, but also with allowance made for their technical level. For this purpose incentive markups on the prices for products of the highest quality category should be added on, if in their technical and economic characteristics they exceed the world level, at the full standard or at a standard which has been reduced by 15-20 percent for products which correspond to the level of the best world achievements. For this the State Committee for Standards should formulate objective criteria of the evaluation of products of the highest quality category according to two indicators: the level of the best world achievements and the exceeding of the world level.

In the decree of the CPSU Central Committee and the USSR Council of Ministers on the acceleration of scientific and technical progress it is noted that the existing system of the evaluation of the results of the economic activity of enterprises and organizations does not influence effectively enough the acceleration of the development of new equipment, materials and technologies. Therefore, the elimination of the discrepancies between the prevailing stimuli of the fulfillment of the production plan and the plan on new equipment is one of the most important conditions of the intensification of the economy on the basis of scientific and technical progress. The interests of the intensification of social production require the scale of production to be expanded and the assimilation of new, more advanced products to be sped up. But meanwhile industrial enterprises objectively have little interest in this.

This happens because in the process of assimilating new products their technical and economic indicators, on which the amount of the reward of the collectives depends, worsen significantly, while the additional expenditures cannot be offset by means of incentive markups. The studies conducted by us at the enterprises of the Ministry of Machine Building for Animal Husbandry and Fodder Production showed that the Zavod selskokhozyaystvennogo mashinostroyeniya imeni Ukhtomskogo and Gomselmarsh production associations with a high share of new products in the total production volume (within the range of 47-55 percent) had lower technical and economic indicators than on the average for the All-Union Fodder Machinery Industrial Association, of which they are a part.

Such a situation is explained by the poor interest of collectives in the interchangeability of products and in the implementation of developments directly at the works. The special system of the payment of bonuses for new

equipment also inadequately orients them toward the achievement of this goal. In essence it keeps this equipment in its field of view only 1 year (the production of the first industrial series), after which these products are not longer considered new equipment, although in most cases they should be grouped with such equipment for at least 3 years (up to the assimilation of series production).

In this connection the need is arising to single out as an object of planning and economic stimulation at enterprises "the volume of new products" (which are produced for 3 years), with allowance made for the share of which in the total production volume it is advisable to form the funds for remuneration according to labor. This will promote the acceleration of the development of new highly productive equipment. In case of the exceeding of the standard time of its assimilation the amount of the reward should be reduced.

In this respect the experience of the Ministry of the Electrical Equipment Industry in the recalculation of the volume of the standard net output with allowance made for the economic efficiency of new products of the highest quality category merits attention. The assets of the reserve (centralized) material incentive funds perform the function of stimuli of the updating of production. However, as practical experience showed, frequently the material incentive fund of enterprises is replenished without adequate substantiation. Moreover, when obtaining additional assets during the period of the assimilation of a new product, enterprises are not always interested in shortening the time of its assimilation.

In our opinion, for the improvement of the use of the assets of the reserve (centralized) funds it is advisable to recommend to ministries to develop scales of the dependence between the share of new products (with allowance made for their complexity and time of assimilation) in the total production volume and the share of the assets being allocated for the replenishment of the incentive funds of enterprises. It is very important to orient enterprises toward the quickest increase of the output of new products during the first years.

Great importance is being attached to the increase of the material interest of the participants in the development and assimilation of highly efficient equipment, technologies and new materials, which correspond to or exceed the current technical and economic level. For this purpose one-time bonuses of ministries and departments of the USSR and the councils of ministers of the union republics in the amount of 3,000 to 40,000 rubles each are being introduced for the indicated achievements.

It is permitted to pay bonuses to managerial, engineering and technical personnel and other specialists in excess of the established maximum amounts. Along with this it is necessary to use each bonus ruble efficiently. For industry as a whole significant amounts are being spent annually on stimulation for new equipment. Here according to the calculations each person paid a bonus on the average accounts for more than 60 rubles a year. Their number comes to 14.3 percent of the number of industrial personnel engaged directly in production. But meanwhile at the enterprises of several machine building ministers, for example, the Ministry of Power Machine Building, half

of the total number of their workers are paid bonuses for new equipment. Thus, assets, which could be used more effectively for stimulating the immediate performers of the operations on new equipment, are being dispersed. Clear recommendations on who should receive an incentive and methods of calculating the personal contribution and effectiveness of workers in the sphere of scientific and technical progress are needed.

The violation of the principle of novelty in case of the stimulation of workers with respect to the second source (by means of deductions from the markups on the prices for products with the State Emblem of Quality), in our opinion, is another cause of the vastness of the group of people who are paid bonuses for new equipment. The peculiarity of the formation of the sources of stimulation in question lies in the fact that their amounts depend on the scale of the assimilation of new equipment, the time of which, as a rule, reduces to 3 years. In much the same way as this, apparently, new products can also be considered new equipment for 3 years. However, the deductions from the incentive markups for products with the honored pentagon are made during the entire period of their effect, that is, 5-6 years, and at times a longer period. Here it should be borne in mind that at enterprises with series and mass production (the Ministry of Tractor and Agricultural Machine Building, the Ministry of Machine Building for Animal Husbandry and Fodder Production, the Ministry of the Automotive Industry) 3 years after the start of the assimilation of a product which has the State Emblem of Quality its production volumes increase. Essentially the entire collective, the service of which is the organization of production and its maintenance at the level necessary for the production of products of the highest quality category, is engaged in this. Therefore, doubt arises about the advisability of limiting the payments by means of the incentive markups for products with the Emblem of Quality after their recertification to the special system. In this connection the managers of enterprises should be granted the right to spend at their discretion from 50 to 70 percent of the assets, which were received from the markups on products with the State Emblem of Quality after recertification, for the increase of the bonuses for the current results of economic activity.

The formation of a unified material incentive fund, in which the markups on the prices for high quality products for their use on the basis of the needs of production are included, is envisaged by the conditions of the large-scale economic experiment for the enterprises of the Ministry of the Electrical Equipment Industry.

The increase of the responsibility of the managerial personnel of enterprises for the fulfillment of the plans on new equipment is one of the important directions which are envisaged by the decree on the acceleration of scientific and technical progress. In particular, the bonus for them in case of the nonfulfillment of the assignments on new equipment, as well as in case of the output of products after the expiration of the standard time of their updating will be reduced by not less than 25 percent. Moreover, until recently the indicator, which characterizes the fulfillment of the assignments on new equipment, being one of the additional conditions of the payment of bonuses, dictated the possibility (but optional nature) of reducing the amount of the bonus to workers in case of its nonfulfillment. Thus, the indicator of new

equipment was in a subordinate position with respect to the numerous other indicators.

In our opinion, the use of the indicators of the payment of bonuses for new equipment should be differentiated for workers of different skills and job groups. For the managerial personnel of enterprises it would be possible to envisage the fulfillment of the plans on the development of new equipment and the observance of the time of its assimilation; for the managers and engineering and technical personnel of functional subdivisions--the effectiveness of the implementation of measures on new equipment by the corresponding subdivisions; for the managers and engineering and technical personnel of the subdivisions of basic production--the degree of the assimilation of new equipment, and of auxiliary subdivisions--the degree of the fulfillment of the assignments which ensure the assimilation of new equipment, and so on. In case of the payment of bonuses it is necessary to specially single out the services, on the efforts of the workers of which the implementation of the technical policy at the enterprise depends the most. It seems advisable to envisage within the system of current bonus payment the stimulation of workers of research and design subdivisions, as well as workers of the capital construction division, who are engaged in the reequipping of production, for the immediate achievements in the area of technical progress regardless of the fulfillment by the enterprise of the basic technical and economic indicators.

The fulfillment of major sectorial and intersectorial operations on the so-called comprehensive goal programs at present is assuming the greatest importance. Since the solution of this problem requires additional efforts and in many respects depends on the initiative and efficiency of the managerial personnel of both enterprises and the management staff of the superior unit, it seems advisable to envisage steps on their stimulation. The introduction of the payment of one-time bonuses to the workers of all-union industrial associations and the central staff of ministries for the formulation and implementation of sectorial goal programs could be one such step.

The participation in the "science--production" cycle of subdivisions, which have different goals and tasks, requires the increase of their mutual responsibility to each other along the chain, as well as for the overall ultimate achievements in the area of scientific and technical progress. The material liability of users for the rejection of the equipment produced in accordance with their orders or for a long period of its placement into operation is envisaged. In turn, the responsibility of both the developers and the producers for the conformity of the stated technical characteristics of the produced equipment to the actual characteristics, which are identified in the process of its use, should be increased. Frequently these parameters prove to be significantly lower than those incorporated in the technical specifications, as a result of which the new equipment does not justify the expenditures made on it. This happens because the user, who is interested in the quickest production of new products, is willing to confirm the amount of the impact without proper checking, since he does not bear economic liability for this. That is why enterprises should establish for them more sound assignments on the increase of production efficiency with allowance made for

the parameters of the equipment being put into operation. As a result their demandingness on developers when coordinating the technical specifications will be increased.

The solution of the problems touched upon in this article will make it possible, in our opinion, to increase significantly the interest of collectives and individual workers in the acceleration of the pace of scientific and technical progress, which is the main factor of the increase of social production.

FOOTNOTES

*The article is being published for the purposes of discussion.

1. PRAVDA, 23 November 1984.
2. EKONOMICHESKAYA GAZETA, No 41, 1981, p 13.
3. PRAVDA, 9 December 1983.
4. P. Pogudin, Ye. Osatyuk, "The Economic Mechanism of the Management of Scientific and Technical Progress in the Sector," PLANOVYE KHOZYAYSTVO, No 11, 1983, pp 74-75.

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CSO: 1814/147

PROBLEMS OF MATERIAL, TECHNICAL SUPPLY OF SCIENCE

Moscow MATERIALNO-TEKHNICHESKOYE SNABZHENIYE in Russian No 5, May 85 pp 26-30

[Article by F. Kontorovich, chief of a sector of the Leningrad Department of the Scientific Research Institute of the Economics and Organization of Material and Technical Supply (Leningrad): "Efficient Supply for Scientific Organizations"]

[Text] The process of the intensification of the economy on the basis of the achievements of scientific and technical progress is a complex and in many respects contradictory phenomenon. The appearance of some contradictions or others is explained by the fact that the growth of productive forces also cannot but give rise to certain changes in production relations. Precisely this also predetermines the need for the making of qualitative changes in our economy. Such changes are imminent and have become necessary in the development of the productive forces and in their transformation on the basis of scientific and technical progress.

The improvement of the management of the economy and the qualitative improvement of planning are inconceivable without the strengthening of the cooperation of science and production. And this is explicable, since the tasks of the development of each of these spheres should not be opposed.

The relaxation of the attention of any level of planning and management even to one of these two objects is fraught with serious national economic losses. Shortcomings in the quality of the planning and organization of science are especially dangerous. The point is that they are perceptible only after a long period of time, when in the current production plans it is actually found that a number of "new" technologies and equipment do not conform to the level achieved by the most developed industrial countries.

The new demands on the intensification of the economy should be met by all the units of the national economic complex, including the organs of material and technical supply. This circumstance makes opportune the critical evaluation of the prevailing procedure of the supply of scientific and scientific and technical organizations.

The main peculiarity of science as a consumer of material resources consists in the fact that for planning and distribution organs it is an exceptionally

inconvenient object. The amount of its total needs comes on the average to about 1 percent of the total amount of raw materials, materials and equipment, which are consumed by industrial production. This is substantially less than the error permitted today in case of the calculation of the balances and plans of distribution. That is why the illusion of a lack of problems in the supply of science is created. However, there are many problems here.

First of all it should be pointed out that the small volume of consumption of material resources in case of the frequent change of their range does not facilitate, but complicates the processes of planning, distribution and realization. This has the result that at times it is easier for the workers of planning and distribution organs to ignore the need of scientific research institutes and design bureaus than to use simultaneously two amounts, one of which is a hundredth or else a thousandth as great as the basic amount.

As a result the needs of science are poorly reflected in the consolidated plans of supply. A significant portion of the orders for a small amount of resources is not accepted for filling not only by the organs of the USSR State Committee for Material and Technical Supply, production and transportation, but also by scientific organizations' own supply divisions. Thus, in 1982 the specified need of the subdivisions of the Spetsstekhosnastka Scientific Production Association for rolled metal products was represented by 300 type, grade and brand sizes. Only seven items with the largest volumes of consumption were left in the consolidated plan. The minor needs of the subdivisions were met by way of operational "supply." Such a significant loss of economic information hinders the obtaining of reliable data on the need with a breakdown by both territory and sector.

The quality of the planning and organization of the supply of research and development in many respects depends on the skills and initiative of the workers of the supply services of scientific research organizations. However, as the results of the investigation show, many of them have a quite low general educational and occupational level. As a rule, they have a secondary education and a length of service in this area of 2-3 years. And the remuneration of their labor is significantly less than that of workers of the same services of industrial enterprises.

All this, in our opinion, does not induce the workers of the supply services of science to increase their skills and to display the initiative which is necessary for the fulfillment of their specific functions. For the process of supplying research and development with resources is not confined only to supply and marketing organs and is not limited to the range of products which are produced by industry. The exchange of pilot experimental products, which are produced at pilot plants (works), constantly occurs between scientific research institutes and design bureaus. They play a most important role in case of the conducting of basic research and predetermine the quality and progressiveness of future items (technologies).

Today researchers spend a lot of time on the search for and acquisition of pilot experimental products, since neither the main administrations of supply of ministries and departments nor the territorial organs of the USSR State Committee for Material and Technical Supply nor the workers of the supply

services of scientific institutions themselves are engaged in providing substantial assistance in meeting their needs for them.

The use in one development or another of an advanced, but very scarce purchased item can lead to the upsetting of the time of its introduction. The use of a purchased item, which is of lower quality, but is not scarce, facilitates introduction, but leads to a decrease of the quality of the development itself and maintains at a high level the need for an obsolete component. The procedure now in effect, in case of which the use of materials and items is coordinated at various stages of scientific work, in essence is an unregulated form of unsatisfactory attempts at implementing preplanning intersectorial links of the production and consumption of scarce products. This process in many respects reflects the defects of a methodological nature in the solution of the problem of comprehensive planning and in poor study of the interconnection of the plans of production and new equipment.

Today the problem of the supply of research operations with scientific instruments and equipment is also urgent. In the solution of this problem scientific research institutes, design bureaus and scientific production associations are cooperating with their own and other ministries (departments), industrial enterprises, enterprises for deliveries of products of our system and scientific research organizations of their own and other regions.

The existence of a quite extensive network of intradepartmental and departmental supply organs is to a certain extent an obstacle for the more complete use of the potentials of our systems. At present of the total number of workers, who are engaged in supply and marketing activity, the USSR State Committee for Material and Technical Supply accounts for only about half. The inadequate concentration of resources and the management of the process of supply has an especially harmful effect on the users who consume a negligible amount of products. Scientific research organizations are also among them. The multidepartmental and multichannel nature of their supply leads to a number of negative phenomena. Let us examine two departmental systems which deal with the material and technical supply of science of higher educational institutions and academic science.

The Main Administration of Supply of the RSFSR Ministry of Higher and Secondary Specialized Education, which has four interoblast offices in Moscow, Leningrad, Sverdlovsk and Rostov-on-Don, supplies with material resources the higher educational institutions located on the territory of the RSFSR. Such a negligible number of supply offices for the vast territory leads to the loss of efficiency and high distribution costs.

In the organs of the USSR State Committee for Material and Technical Supply the distribution costs per ruble of the total commodity turnover are nearly half as great as in the system of the Main Administration of Supply of the RSFSR Ministry of Higher and Secondary Specialized Education. This is explained first of all by the fact that its offices perform a large amount of work on the delivery and conveyance of products, and their shipment is carried out over large distances in small batches. For example, the Leningrad Interoblast Office sells products which have been assigned by order to

suppliers located in Leningrad and Leningrad Oblast, as well as the Latvian, Estonian and Lithuanian SSR's, the Komi ASSR, the Chuvash ASSR, Kaliningrad, Pskov, Novgorod and Yaroslavl oblasts. The deliveries of products of several line items to Leningrad users take place through the interoblast office from Kiev, Kazan, Baku, Ordzhonikidze and other cities. As a whole this office serves more than 300 users, of which only 41 are situated directly in Leningrad. And at the Moscow office "out of town" users account for the bulk of the warehouse commodity turnover.

A characteristic feature of these offices is work with a wide assortment (more than 15,000 items) of products with small volumes of consumption. From the delivery enterprises of the Leningrad and Moscow city main territorial administrations they receive such an amount of products, which constitutes approximately 1 percent of their warehouse commodity turnover. Meanwhile, the range sold by them is covered almost entirely by the range of products of these main administrations.

A similar situation has also developed with the distribution of resources through the Central Supply and Marketing Administration of the USSR Academy of Sciences and its supply offices. And here the typical feature is activity with a very broad range of products (more than 13,000 items) with exceptionally small volumes of consumption by individual scientific institutions and organizations. The Moscow and Leningrad offices receive only about 3 percent each of their warehouse commodity turnover from the enterprises for the delivery of products of the Moscow City and Leningrad main territorial administrations, and with respect to a very limited range (rolled metal products, paints and varnishes, construction materials, sanitary equipment, general plant equipment). And this is given the fact that the range of items of products, which these offices use, also coincides almost entirely with the range of the indicated territorial organs of the USSR State Committee for Material and Technical Supply.

The Pribory showroom stores of the USSR Ministry of Instrument Making, Automation Equipment and Control Systems, which sell the same items as delivery enterprises, are entering into direct "competition" with our system. However, whereas the latter receive assets centrally, the Pribory showroom stores receive them by means of simplified intrasectorial purchases from the enterprises of their sector.

The departmental organizations of material and technical supply, which operate in parallel, are dividing into parts the volume of the territorial need of science, which is small as it is. This not only is leading to the increase of national economic costs and unjustified competition, but also is complicating and destabilizing the process of planning and distribution.

Today only about 50 percent of the assortment of instruments, materials and components, which science needs, passes through our system. Unfortunately, many initiatives in the area of the improvement of the supply of science do not always yield the desired results.

Thus, the USSR State Committee for Material and Technical Supply is constantly broadening the geography of the centers for the rental of measuring equipment

and is increasing the amounts of their funds. In practice rental has become one of the forms of the unfunded, unlimited supply of all scientific organizations regardless of their departmental affiliation. The scientific institutions which are supplied via departmental channels, including through the Central Supply and Marketing Administration of the USSR Academy of Sciences and the Main Administration of Supply of the RSFSR Ministry of Higher and Secondary Specialized Education, also readily resort to the services of the enterprises of our system. However, the increase of the stock of instruments at our rental centers is being seriously checked both by the shortage of capital investments for the development of these centers and by the great difficulties in their complete supply with instruments of the range of departmental distribution.

Due to the dispersal of the material resources needed by science among various ministries and departments the system of small-scale wholesale unfunded trade has also not received proper development. Today the resources of this form of supply can be formed only by means of the range of products for production engineering purposes, which are distributed by our system. However, this is not in keeping with the solution of the problem of the unfunded, comprehensive (with respect to the entire necessary range) supply of science.

At present the organization of the supply of science by our system is being carried out with respect to three forms. Specialized cost accounting commodity subdivisions--orgnauchkomplektsnabs [not further identified]--have been established as an experiment in some territorial organs, specialized divisions have been established in others. And, finally, in the third ones, which make up the largest group, the coordination of the supply of science of their region is assigned to one of the functional subdivisions.

The effectiveness of the last form, as experience shows, to a significant extent depends on the enthusiasm of the performers. The second form is more effective, to which the successes of the specialized department of Sverdlovsknauchkomplektsnab [not further identified], which operates within the Sreduralmashsnabsbyt Association, attest. However, this form has not received extensive dissemination.

In the early 1970's orgnauchkomplektsnab specialized cost accounting administrations were formed in Leningrad, Odessa, Kazan and Minsk. The first period of their activity attracted attention to this form of the supply of science. The point is that the work experience, for example, of the Leningrad orgnauchkomplektsnab administration demonstrated the fundamental possibility of the purposeful study of the demand of scientific organizations for products for production engineering purposes and the choice of the most efficient form of their supply. The possibility of the performance by these administrations of the functions of a wholesale unit for all scientific organizations of the region with respect to all types of the balance-sheet range, regardless of departmental affiliation, was also demonstrated. The organization of such a form of supply made it possible to obtain and accumulate the information which is necessary for the changeover to the unfunded meeting of the needs of scientific and design operations through a system of specialized and general-purpose small-scale wholesale stores.

Sample surveys showed the substantial increase of the degree of the meeting of the need of science for individual types of resources. At the first stage of the work of the orgnauchkomplektsnabs the tendency for the amount of physical assets and reserves of the range of the USSR State Committee for Material and Technical Supply, which are not used at scientific organizations, to decrease was also revealed. The possibility of organizing a wide range of service (especially organizational intermediary and information services) was demonstrated. The centers for the rental of measuring equipment, which were set up under the orgnauchkomplektsnabs, passed most rapidly through the phase of developed.

All this makes it possible to draw the conclusion that the very idea of organizing such specialized subdivisions of territorial organs not only was progressive, but also contained a large potential reserve of the qualitative improvement of supply on the regional level. The latter circumstance is deliberately singled out. The point is that the organization and management of the supply of science on the territorial level were separated from the vertical lines of management. The functions of the management of these objects did not receive the proper coordination with the upper levels of planning and distribution organs. This circumstance was not the only one among those which slowed the development of specialized forms of the management of the supply of science.

The products, which are distributed in a planned manner, serve as the basic source of the formation of the commodity resources of orgnauchkomplektsnabs. The internal resources of scientific organizations, decentralized procurement and the meeting of a portion of the demand for instruments through rental centers are used by way of mobilization as additional sources for the meeting of the demand.

However, a certain worsening of the structure of commodity resources (with respect to the sources of formation) was observed in the 1970's and 1980's. Given the existing quality of statistics it is quite difficult to identify the causes of this phenomenon. Nevertheless, it is possible to distinguish the two most significant ones: the first is the substantial decrease of the priority of this category of users in case of the distribution of products, the second is the change of the qualitative and quantitative structure of the users themselves, who are supplied with resources through orgnauchkomplektsnabs. By the end of the period in question the largest, most powerful scientific research and planning and design organizations had become a part of scientific production associations and had left the "clientele" of these administrations.

The process of the development of the experiment also slowed down for the reason that the indicator of the volume of wholesale sales, the number, the wage fund and the category of the remuneration of labor, material stimulation--all these economic levers, which are necessary for the normal functioning of any national economic unit, had come into conflict with the specific features and functions of these administrations. The planning and evaluation of the activity of orgnauchkomplektsnabs, as of ordinary commodity administrations (associations), had the result that the volume of sales of commodity production, which science accounts for, ceased to be dominant.

Owing to the noted and other circumstances these administrations were not able to properly develop the necessary network of small-scale wholesale stores. The survey conducted in 17 territorial organs of our system showed that on the average the volume of the delivery of resources to scientific research organizations via small-scale wholesale trade does not exceed 10 percent, the level of funded supply still remains very high.

In our opinion, the delivery of the necessary resources to users through small-scale wholesale trade should occupy a larger place in the supply of science. The process of combining this form of supply with the industrial activity on the production of products for use in production, which is being actively developed in the system of the USSR State Committee for Material and Technical Supply, is poorly studied, but very promising. However, for this category of users production services should be not so much of a procurement and packaging nature as of a pilot experimental, trial nature.

While directing attention to small-scale wholesale trade as the basic channel of the supply of science under the conditions of centralized planning, I would like to point out the following. In contrast to the capitalist economy the socialist economy saves exchange partners from the arbitrary search for contact between them. The system of the distribution and circulation of means of production, which is organized according to a plan, is a great benefit. It is merely a question of how to manage it and to see to it that the merit would not be turned into a drawback.

For this reason in case of the organization and isolation of the process of meeting the insignificant needs of science it is necessary not only to preserve, but also to strengthen the centralized planned nature of the distribution of material resources. Such a stand may evoke the question: Will this not entail an even greater decrease of efficiency than at present? Such a danger actually exists. But under certain conditions it does not arise.

It seems that in the circulation of means and objects of labor the subjects of science should be involved only in the process of exchange. The latter for these users should appear as a method of supply by way of small-scale wholesale trade, which is centralized in form. In essence both the material resources, which are distributed according to a plan, and the resources, which are acquired by means of decentralized purchases, should be for territorial supply organs the basis of the formation of the reserve commodity stocks which are necessary for this.

The organization of such a form of the supply of science is a complicated matter. For in order for scientific organizations to acquire promptly the resources necessary for the performance of research operations without submitting orders to their ministries and departments, it is necessary to have them beforehand in the region. As the experience of the USSR State Committee for Material and Technical Supply shows, it is far from easy to ensure this.

In 1975 when preparing the order of the USSR State Committee for Material and Technical Supply "On the Improvement of the Organization of the Supply of Scientific Research and Planning and Design Organizations" far from all the

ministries and departments agreed to transfer to our system the assets for the supply of the organizations subordinate to them by way of small-scale wholesale trade. Under these conditions it proved to be difficult for the all-union main administrations of supply and sales to single out by a separate line for territorial organs more than a negligible portion of the resources received from the ministries. And the very process of transferring funds with respect to the range of the USSR State Planning Committee assumed at times a strange form. The fund-holding ministries attempted to decrease the amount of funds being transferred, which was negligible as it was, although they were intended for the supply of their organizations.

Therefore, without some alteration of the ingrained departmental approaches the changeover to intensive forms of the supply of science will be difficult. It is necessary to transfer to our system the resources for the supply of science. This will simplify the work of the USSR State Planning Committee and the ministries. If the separate line "For Science" is singled out more distinctly in the plans of distribution, a specialized reserve--the stock intended for the assurance of the necessary flexibility and efficiency of the supply of this category of users--will appear more rapidly.

The most difficult aspect of the problem in question is the identification of the needs under the conditions of unfunded small-scale wholesale trade. However, it seems that as a whole this problem is also solvable. Apparently, the gathering of reliable information should be immediately started jointly with the scientific research institutes and design bureaus of the sectors being served. A new mechanism of their cooperation with supply organs, which in the future would replace orders--the only source of information today for the determination of the needs--has to be found and tested.

In our opinion, the subsystem of the supply of science should satisfy the requirements of planned centralism, that is, have relative isolation on the planning and organizational management levels. Such isolation should be not a goal, but only a means for the more efficient supply of science, which is working for the common task of the intensification of our economy.

In case of the development of the subsystem of the supply of science a large additional load will fall on the territorial organs of the USSR State Committee for Material and Technical Supply, since the enlargement of the range and assortment of products for scientific research and design organizations will prove to be not equivalent to the increase of the mass of goods, which will additionally pass through the resource-carrying channels of the USSR State Committee for Material and Technical Supply. This circumstance can give rise to new contradictions in place of the old ones. In order to reduce the possible negative phenomena to a minimum, this additional amount of work has to be estimated and it has to be determined, by means of what resources it can be performed.

Among the various types of products for production engineering purposes, which are distributed by planning organs, there is one which is intended only for science, for its equipment. This is scientific instruments. In the total volume of material resources used by it instruments and automation equipment

account for up to 60 percent. But, unfortunately, only 20-30 percent of the need for scientific instruments is being met.

For nearly 20 years now the question of the need for the development of a reliable classifier of scientific instruments as the basis of planning and the development of a system of the centralized planning of production, accounting and management has been raised periodically. As a whole for the country the production, distribution and use of scientific instruments are being poorly managed, coordinated and, as a consequence, analyzed.

The improvement of the procedure of supplying scientific organizations and the improvement of planning and distribution activity are important measures. But this, too, is only a means for the achievement of the ultimate goal--the high quality supply of our designers and scientists with scientific tools, advanced components and materials.

Hence, all these products should come to be in the plans of distribution. But for this industry should produce them in the necessary quantity and assortment. Here the circle, which determines the interconnection and interdependence of science and production, has been closed. Production expects from science advanced equipment and new intensive technologies. And this is legitimate. Just as it is legitimate that science has the right to expect from production the most modern scientific instruments and other means for the experiment. Apparently, in this matter one should expect more effective steps on the part of the USSR State Committee for Science and Technology, the USSR State Planning Committee and the instrument making sectors.

Science should always be regarded as the most important user of material resources, since the process of accelerating scientific and technical progress should become stable and, what is the main thing, constant. In this lies the guarantee of the success of the intensive development of our economy.

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CSO: 1814/182

UDC 061.22

REORGANIZATION AT NOVOKRAMATORSK MACHINE BUILDING ASSOCIATION

Moscow MASHINOSTROITEL in Russian No 2, Feb 85 pp 10-12

[Article by A. S. Gavrilshko, deputy chairman of the council of the primary organization of the Scientific and Technical Society of the Machine Building Industry and deputy director of the Scientific Research Institute of Heavy Machine Building of the Novokramatorsk Machine Building Plant: "The Authority of the Council of the Scientific and Technical Society Is Increasing"]

[Text] The functions of the scientific and technical council (NTS) of the association were transferred to the council of the scientific and technical society of the primary organization of the Novokramatorskiy mashinostroitelnyy zavod Production Association in 1974. The careful analysis of the activity of both councils, which showed that their functions and the content of operations were in many respects identical, preceded this decision. Although the basic questions of the development of production and the improvement of the equipment being produced were settled through the scientific and technical council, the authority of the council of the scientific and technical society of the association by this time had increased appreciably and its role was no longer confined to the organization of scientific and technical reviews and competitions, the dissemination of advanced know-how and the assurance of the payment of membership dues. Therefore, the transfer of the function of the scientific and technical council to the council of the scientific and technical society under these conditions contributed to the further strengthening of the authority of the primary organization of the scientific and technical society in the association, to the extensive enlistment of the scientific and technical community in the management of production and in participation in its technical improvement, to the development of the creative initiative of engineering and technical personnel and worker-innovators and to the increase of the activeness of the work of the primary organization of the Scientific and Technical Society of the Machine Building Industry.

After the making of the decision on the transfer of functions the substantial organizational reform of the structure of the management of the primary organization of the scientific and technical society and the council of the scientific and technical society was carried out. During the reelection mainly managers of works and divisions were elected chairmen of the shop organizations of the scientific and technical society. The managers of services and chief specialists headed the sections of the council of the

scientific and technical society. In connection with the specification of the directions of the activity of the primary organization of the scientific and technical society and the composition of the sections the number of the latter was increased from 14 to 22. Moreover, the statutes on the sections were revised or developed anew. Now all the managers of the sections are members of the council of the scientific and technical society, which the chief engineer of the association heads.

The council of the scientific and technical society drafts the plans of its work for a year and examines them at the first meeting. The questions, which are planned for examination in the plans of the scientific and technical council of the ministry, are included without fail in the plans. The meetings of the council and its sections, the annual plans of which are also approved by the council, are held no less often than once a month and minutes are kept without fail, while the decisions are conveyed for execution to the services and sections of the council in accordance with affiliation with the establishment of control over their implementation.

During the organizational reform the procedure of the preparation and submitting of materials to the meeting of the council of the scientific and technical society in case of the consideration of the designs of new machines, units and technological processes was made more precise. The meeting participants should acquaint themselves in advance (no later than 3 days) with the materials submitted to the council and the draft of the decision on the given issue. The council appoints opponents to the main speaker, while it enlists competent specialists in the preparation of questions for the meeting. Commissions for the preparation of materials for the meeting of the council and a draft of the decision are set up for the settlement of complicated organizational questions. The duty to evaluate the technical level of the designs of machines, equipment, technological processes and other completed developments is assigned to the council of the scientific and technical society and the councils of the sections.

The council of the scientific and technical society of the association is actively contributing to the implementation of 26 all-union, sectorial and regional programs on the development of science and technology, in which the NKMZ [Novokramatorskiy mashinostroitelnyy zavod] Production Association is taking part. Thus, just the implementation of a set of organizational and technical measures on the improvement of internal production made it possible to free conditionally about 2,000 people, to increase the degree of mechanization by 4.4 percent and to obtain a saving in the amount of 8.82 million rubles. Thus, the council of the scientific and technical society is becoming more and more the most important functional unit in the system of the management of scientific and technical progress in the association and an organ of the determination of a scientifically sound technical policy, which is actively promoting the extensive use of the latest achievements of domestic and foreign science, technology and advanced know-how.

The council of the scientific and technical society is devoting special attention to questions of the efficient consumption of metal, trying to see to it that machines with the NKMZ stamp would be less metal-consuming. Very much

here depends on the members of the section of the scientific and technical society for designing. Thus, the group of designers N. I. Kaganovskaya, V. S. Glazkov, Yu. N. Belobrov and V. I. Ponomarev, who are members of the scientific and technical society, proposed a fundamentally new system of the trimming of rolls on hot rolling mills--the pallet system, which envisages the performance of this operation in special devices. The use of such a decision made it possible to decrease by nearly 500 tons the weight of the equipment.

The council of the scientific and technical society is attaching great importance to the decrease of the weight of hydraulic presses. Owing to the unusual design of the bed of these giant machines, to the development of which members of the sections of the scientific and technical society made their contribution, the weight of the press was reduced by 3,000 tons.

The primary organization of the scientific and technical society is performing much work on the economical use of metal in billet production and is devoting special attention to efficient methods of obtaining billets. Thus, on the suggestion of the council of the scientific and technical society sections for the production of assembly and welding accessories from scraps were organized in the shops of metal components. Just 1 such section annually saves about 300 tons of rolled metal.

The members of the scientific and technical society, who are efficiency experts, are making a significant contribution to the money box of the saving of ferrous metals. As a rule, they outline assignments on the saving of metal in their personal creative plans and socialist obligations. For example, lathe operator and USSR State Prize winner V. Strizhak by means of the maximum use of billets when making series-produced parts annually saves 3-5 tons of steel, while electric welder and Order of Labor Red Banner winner A. Balyuk saves hundreds of kilograms of electrodes.

Efficiency experts and members of the scientific and technical society M. Chikunov, P. Sokolov and V. Lebedintsev proposed a new design of racks and packaging, which made it possible to save 175 tons of metal, while A. Shishmakov and A. Kozlovskiy changed the technical layout of the loading ramp of the assembly shop and saved more than 40 tons of metal.

The collective of the youth public design bureau made up of members of the scientific and technical society V. P. Ilina, L. I. Odina, V. N. Goliko, V. N. Tiunova, V. S. Plugatar, S. S. Shramchenko, S. E. Koporovich, A. A. Khlestun and A. P. Skryagi is also making a large contribution to the saving of metal. In 1984 alone from the implementation of their suggestions on new design developments more than 700 tons of ferrous metals were saved. Thus, on the suggestion of the members of the bureau a three-cylinder telescopic adapter, which reduced by nearly one-half the length of the upper frame and the lifting mechanism, which in the end decreased the weight of the unit by 449 tons, was developed and introduced in the roll changers of the 3000 and 3600 rolling mills, while the use in the geared spindle of the 1700 rolling mill of the suggestion on a new configuration of the geared hinge made it possible to save over 26 tons of metal.

In matters of the saving of metal the members of the section are playing a large organizing role, supporting by deed all the valuable initiatives of the Novokramatorsk workers. They took an active part in the creative search under the motto "The Level of Inventions and the Greatest Efficiency for Developments of New Equipment" and are constantly aiming not only their own members, but also all designers at all the innovations, which have been developed by innovators of the association or have been borrowed from other sources, being introduced without delay in production. And in this the sections enjoy the full support of the council of the scientific and technical society.

The council of the scientific and technical society of the association is devoting constant attention to the strengthening of the contact of science with production. The association is actively cooperating with many scientific research organizations of the country. The effectiveness from the introduction of the results of the conducted research and development during the years of the 11th Five-Year Plan has increased by 10 percent and has been brought up to 2.5 rubles per ruble of expenditures. In strengthening and developing the creative contacts of the association with the institutes of the Ukrainian SSR Academy of Sciences in the more complete use of the scientific and technical potential and in the speeding up of the introduction in production of scientific and technical achievements and the results of research, on the initiative of the council of the scientific and technical society of the NKMZ Production Association and the Ukrainian SSR Academy of Science a contract on creative cooperation was concluded, a comprehensive plan of joint scientific research work on the development and introduction of new equipment for 1984-1985 and to 1990 was drafted and approved.

Under the new organizational conditions the council of the scientific and technical society is working in close contact with the All-Union Society of Inventors and Efficiency Experts and production services, while keeping under control all questions of the end results of inventing, patent and license work. This made it possible to increase substantially the technical level of the developments of the association. During the years of the past five-year plan of the total number of completed operations on new equipment, which can be protected, more than 80 percent were fulfilled at the level of inventions. During this period 453 applications for inventions were officially registered, 335 positive decisions were received. The economic impact from the use of inventions increased by sixfold. Owing to the increase of the quality of patent research the association has the highest percentage in the sector of positive decisions on applications for inventions.

The organization of reviews and competitions in the basic directions of the increase of production efficiency, which are held for the purpose of enlisting the scientific and technical community at large in this work, is one of the effective forms of the work of the council of the scientific and technical society. In accordance with the results of the All-Union Public Review of the Fulfillment of the Plans of Scientific Research Work and the Use of the Achievements of Science and Technology in Machine Building for 1983 the association was awarded first prize and the Certificate of the Central Board of the Scientific and Technical Society of the Machine Building Industry.

The council of the scientific and technical society is performing much work on the support of the valuable initiatives of specialists and the organization of the socialist competition of the engineering and technical community in accordance with personal creative plans. Thus, in 1983 the engineering and technical personnel of the association came forth with an initiative on the significant decrease of the technological labor intensiveness of the output being produced by the revision of the designs of parts, assemblies, machines, technological processes and the time allowance for their production. This is making it possible in a shorter time to increase the labor productivity of workers and to decrease sharply the material expenditures on the introduction of organizational and technical measures. Having supported this initiative, the council of the scientific and technical society is developing it, striving for the maximum enlistment of the scientific and technical community of the association in participation in the socialist competition for the decrease of the labor intensiveness of the output being produced by 1,000 standard hours during the year by each engineering and technical worker. As a rule, measures on the improvement of designs, technology, the organization of labor and production and the decrease of labor expenditures are the main items of the personal creative plans of the competition participants. Competition was launched under the motto "A Comprehensive Approach for the Efficient Use of Working Time and Manpower Resources." The members of the primary organization of the scientific and technical society decided to make their own contribution to the increase of the effectiveness of the competition, having aimed it at the solution of urgent technical, production and economic problems. The appeal "A Great Economic Impact for Every Personal Creative Plan" became a guide to action for the members of the scientific and technical society. At present practically every other member of the society at the association is a participant in the movement of "record-breaking workers," whose creative plans include more than 4,000 measures on the decrease of the labor intensiveness. All this made it possible, in 1983 for instance, to decrease the technical labor intensiveness with respect to the entire products list for the association as a whole by nearly 1 million standard hours. Among those, who made the largest contribution to this achievements, are designers and members of the scientific and technical society Yu. N. Belobrov, V. A. Pankin and V. I. Bondarenko, who elaborated recommendations on the change of the kinematics of the loading and unloading of slabs, which provided in case of introduction a decrease of the labor intensiveness by 6,000 standard hours. Member of the scientific and technical society and senior foreman V. G. Didenko, who not only improved the organization of his own labor, but also made improvements with respect to technological operations in assembly and welding work, provided a decrease of labor intensiveness by more than 2,000 standard hours.

The broadening and development of advanced forms of the organization of labor are a constant object of attention and control on the part of the council of the scientific and technical society. As a result of the implementation of the measures formulated by the council of the scientific and technical society at present 78.1 percent of the workers are covered by advanced collective forms of the organization of labor, including 74.7 percent in multiple-skill brigades and 70.9 percent with the distribution of the wage in accordance with the coefficient of labor participation.

The introduction of the set of measures on the scientific organization of labor is also yielding much: it is envisaged to increase the combination of occupations by 33 percent and to increase multiple-machine attendance to 30 percent. I. B. Mashkovskiy, a multiple-machine attendant of the reduction gear shop, while attending three gear-hobbing machines, in 10 months of last year worked an additional 1,755 standard hours and achieved an 8.5-percent increase of labor productivity. In just 3 years of the 11th Five-Year Plan the use of advanced forms of the organization of labor at the association, in the introduction of which the primary organization of the scientific and technical society took an active part, provided an economic impact of more than 400,000 rubles.

The activity of the council of the scientific and technical society made it possible to step up the work of public creative associations: the public bureau of economic analysis, the public bureau of technical information, the public council for the scientific organization of labor. The work of these associations is now being organized in accordance with plans which are approved in the council of the scientific and technical society, while the introduction of suggestions and recommendations in accordance with the results of the fulfillment of the plans is yielding a significant economic impact. Thus, the results of the conducted review of the operations of creative associations showed that 47 public bureaus of economic analysis, the size of which comes to more than 470 people, performed 106 jobs with a total economic impact of 707,600 rubles.

The NKMZ Production Association among other leading enterprises of Donetsk Oblast came forth with the initiative to launch socialist competition on the increase in 1984 of labor productivity in excess of the plan by 1 percent and the decrease of the product cost by 0.5 percent. In this connection the collective assumed increased socialist obligations, while the council of the scientific and technical society took an active part in the achievement of these above-plan indicators, giving scientific and technical assistance in the extensive introduction of means of mechanization and automation, advanced technological processes and the achievements of science and technology, in the tightening up of labor and production discipline, the development of the socialist competition of engineering and technical personnel, the dissemination of the experience of the leaders and innovators of production and other specific measures.

The council of the scientific and technical society is also giving constant assistance to the administration in the organization of technical training and the increase of the scientific and technical knowledge and production skills of engineering and technical personnel and workers. Courses, seminars and schools of advanced know-how are held regularly; a people's university of technical progress and economic knowledge is operating. When carrying out the recertification of managerial, engineering and technical personnel the administration of the association takes into account the opinion of the council of the primary organization of the scientific and technical society.

The transfer to the council of the scientific and technical society of the functions of the production engineering council of the enterprise increased the level of the work of the primary organization of the scientific and

technical society and contributed to the increase of its authority and organizational consolidation. In the past 5 years the number of members of the society has increased by threefold. The number of sections and other creative associations has grown significantly, the efficiency of their work has increased, the contacts of science with production have been strengthened, the recommendations, which are drawn up by the scientific and technical community, are being introduced more rapidly.

The solution of a number of problems facing the council of the scientific and technical society will make it possible in the future to improve the work of the council of the scientific and technical society under the conditions of the performance by it of the functions of the scientific and technical council and will increase to an even greater extent its authority and importance in the life of the labor collective of the NKMZ Production Association.

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CSO: 1814/176

TRAINING AND EDUCATION

COMPUTER COURSE FOR SECONDARY SCHOOLS

Tallinn MOLODEZH ESTONII in Russian 25 Apr 85 p 3

[Interview with Professor V. Monakhov, director of the Scientific Research Institute of the Content and Methods of Instruction of the USSR Academy of Pedagogical Sciences, by TASS correspondent L. Kislynskaya (Moscow): "The Computer in the School Is a Social Order of the Times"; date not specified]

[Text] The comprehensive and thorough mastery by young people of computer technology should become an important factor of the acceleration of scientific and technical progress in the country. Beginning on 1 September the course "The Fundamentals of Information Science and Computer Technology" is being introduced at all the secondary educational institutions of the country.

[Answer] "Computers are coming to the school--such is the social order of the times," Professor V. Monakhov, director of the Scientific Research Institute of the Content and Methods of Instruction, said in an interview with a TASS correspondent. "The mastering of the language and techniques of programming is not an end in itself, but a practical means for solving problems with the aid of a computer.

"The basic requirement of computer literacy is the training of students for the use of computer technology in their further practical activity. For the computer controls the launch of a satellite, guides an airplane over a course, feeds parts from the warehouse to the conveyor, controls a robot, helps us to buy a plane or train ticket, writes out the bills for a long-distance telephone call and does a large number of other jobs. That is why computers should become a kind of second competence of every educated person.

"Our institute, which headed the research on the introduction in the school of the course 'The Fundamentals of Information Science and Computer Technology,' jointly with the Siberian Department of the USSR Academy of Sciences developed the program of instruction and wrote a textbook," V. Monakhov continues. "The introduction of the course is based on 25 years of experience of studying the fundamentals of programming at schools. Back in 1980 this subject was introduced as an experiment at Moscow Secondary School No 444. Then such schools appeared in Zelenograd and Barnaul. Now there are more than 300 of

them in the country. At many educational production combines, for example, in Oktyabrskiy Rayon of the capital, the training of school children in the specialties of operator and programmer is being carried out. This year the school of the young programmer at the Siberian Department of the USSR Academy of Sciences is celebrating its 10th anniversary.

"The content of the present course was formulated in conformity with one of the provisions of the reform of the general educational and vocational school. Physics and mathematics instructors will undergo by the new school year the appropriate training in seminars, which will be organized at the oblast centers. In the future it has been decided to introduce at pedagogical higher educational institutions the specialty of instructor of information science.

"The technical aspect of the computerization of schools is an important aspect of the introduction of the new educational subject. Not less than 50 offices of computer technology will be needed for the introduction of the new course, while hundreds of thousands of computers should be sent to the sphere of education. At present the institute is engaged in the selection of computers which are most suitable for schools. These questions are being settled in close cooperation with partners from the CEMA member countries and with the use of the experience of organizing educational processes, which has been gained by specialists of several capitalist countries.

"Scientists also have to set up the software and methods support of the educational process. In other words, we are busy with the preparation of packages of various applied programs in all fields of knowledge. For in the future it is planned to make the computer a reliable assistant when studying not only the exact sciences, but also the humanities.

"However, it should not be forgotten," Professor V. Monakhov said in conclusion, "that computer programs should merely stimulate the thinking of the student, and not replace it. The reasonable combination of traditional and computer forms of information processing--that is what the new program is aimed at."

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CSO: 1814/178

UDC 061.22

IMPROVEMENT OF SKILLS OF POWER MACHINE BUILDING ENGINEERS

Moscow MASHINOSTROITEL in Russian No 11, Nov 84 p 24

[Article by engineers V. P. Slobodyanyuk and M. Ye. Kats: "The Council of the Scientific and Technical Society Acts"]

[Text] At one of the meetings of the council of the primary organization of the Scientific and Technical Society of the Machine Building Industry of the All-Union Planning and Technological Institute of Power Machine Building the question of the degree of the creative contribution to the work of the institute of the members of the scientific and technical society--the leading specialists--was discussed. It was noted that the majority of chief project designers, chief process engineers, leading specialists and managers of sectors and brigades are finding fundamentally new solutions in the process of designing equipment. Among them are chief designers V. D. Senyukov, V. P. Vlasov and Ye. A. Chernov, who have to their credit 30-40 inventions each, a significant portion of which have been introduced at plants of power machine building, as well as design engineers and process engineers K. B. Yevstafyev, Yu. P. Shefov, S. D. Morozov and others, who have received 15 certificates of authorship and more each.

Of the 650 members of the scientific and technical society of the institute 1 in 5 is an innovator, while 1 in 3 is the manager of a creative collective which is actively participating in the solution of urgent problems of turbine building.

At present the creative brigades of members of the scientific and technical society are working to full effect on the fulfillment of operations on the technical and economic substantiation of the choice of objects for the establishment of versatile automated production systems with the use of the latest domestic and foreign achievements and are continuing the work on the filling of an important order--the production of GTN-25 gas pumping units, which in the majority of indicators surpass the best foreign models. A significant number of them are already operating successfully on the Urengoy-Pomary-Uzhgorod gas pipeline.

As a result of the analysis made by the council of the scientific and technical society it was ascertained that high indicators are achieved by the majority of specialists only after 10-15 years of work at the institute, that

specialists begin to display creative activeness, as a rule, only at the age of 35 and over, that a limited number of workers of the institute have a high creative efficiency--6-7 innovations a year--while the remainder have to their credit from 1 to 3 inventions during all the many years of work at the institute. The council of the scientific and technical society understood that it is impossible to tolerate such a situation. Therefore the decision was made to organize for associates of the institute a series of lectures, in which the content of many methods and various views on the problem of stepping up creative technical and scientific work would be presented. The majority came out the favor of the possibility of studying first of all the ARIZ (algorithm of the solution of engineering problem) method. It was not believed that it is possible to quickly teach young people and middle-age specialists to solve difficult creative problems, since many thought that this comes with experience and special talent is needed.

As an experiment a group of eight specialists, which chief project designer V. P. Bliznyuk, a member of the council of the scientific and technical society, headed, was sent for training to the Leningrad People's University of Creative Scientific and Technical Work.

After training at the university the creative work of the specialists became more effective, the technical level of developments increased. Thus, young designer Yu. Shefov, having mastered the algorithm of the solution of engineering problems, under the supervision of Ye. A. Chernov developed a number of designs of advanced attachments for turbine building and received certificates of authorship for them. Three of his developments have already been introduced at the Leningradskiy zavod turbinnykh lopatok Production Association imeni 50-letiya SSSR. He also developed a center finder for the precision positioning of the tool in jig-boring machines, the introduction of which made it possible to decrease to one-third the auxiliary time of work at these machines, here the precision of the positions of the tool comes to +0.01 mm.

Leading designer B. M. Kotyukov and brigade manager O. V. Kolesnik, who also took the training course at the university, have achieved great success. Thus, in 1 year alone O. V. Kolesnik together with work colleagues proposed five developments, which deal with the technological process being developed at the institute of the precision stamping of turbine blades, the introduction of which is planned at the Leningradskiy zavod turbinnykh lopatok Production Association and the Nevskiy zavod Production Association imeni V. I. Lenin. Members of the scientific and technical society G. Slepnev, A. Ivanov and others submitted original applications for inventions. The management of the institute is entrusting to these specialists the solution of many difficult problems on the development and introduction of equipment.

At present a second group of specialists is studying at the university of creative scientific and technical work. Another group of specialists is students of the Higher State Courses of the Increase of the Skills of Management, Engineering and Technical and Scientific Personnel in Matters of Patent Studies and Invention. It is necessary to note that the young specialists, who are joining our collective, unfortunately, do not undergo

adequate training at educational institutions in the solution of engineering inventing problems and it is necessary to do much work with them in order to involve them in creative inventing work.

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CSO: 1814/176

AUTOMATION AND INFORMATION POLICY

PROBLEMS, ERRORS IN COLLECTIONS OF STATE STANDARDS

Moscow IZVESTIYA in Russian 2 Apr 85 p 2

[Article A. Kovalenko, docent of the Ural Polytechnical Institute imeni S. M. Kirov (Sverdlovsk): "Without the Right to a Mistake"]

[Text] For any specialist the collection of All-Union State Standards of the Unified System of Design Documents "Obshchiye pravila vypolneniya chertezhey" [The General Rules of Executing Drawings] is a handbook. It was published by the State Committee for Standards in 1983. And here, let us assume, a designer is seeking the needed All-Union State Standard "The Marking of Dimensions and Maximum Deviations." And what of it? On the 13 pages of the standard it is literally florid from designations which were abolished long ago by the State Committee for Standards itself.

The standards of the CEMA Unified System of Tolerances and Fits were legalized 8 years ago. They replaced the system previously in effect, but in the collection it was retained for some reason. What is the designer to do? Which standard is one to believe?

It gets worse and worse. In the drawing, for example, it is necessary to designate the hardness after the heat treatment of the surface of the part. In the standard, which was republished 2 years ago, there are designations of the hardness according to standards which were abolished 5 years ago. It is also much the same thing with the designation of the properties of materials.

The collection has editors and a proofreader, in it there are references to main organizations and research institutes. But it is impossible to use it--there are flaws in 80,000 copies.

In the collection of standards "Osnovnyye polozheniya" [The Basic Statutes] there are even more mistakes. Their history began not last year, but 8 years ago. Since that time the collection has been published four times, and each edition abounds in absurdities. But confusion and an alternate version are intolerable in standardization. They do direct harm to the matter: it is difficult to treat seriously a "trivial" standard, and it is put aside.

Today about 23,000 standards are in effect in the country. Until recently there were two-thirds as many. Year after year about 2,000 All-Union State Standards are added--on the average 5-6 a day. Of course, a portion is

repealed, but appreciably fewer. Specialists regret such an increase. Some conservatism is appropriate here: the standard cannot be changed annually.

Not only the standards, but also the "makeweights" to them are increasing in number. Each month the State Committee for Standards publishes in mass editions information indices, in which there are 200-300 pages of amendments to the All-Union State Standards. In a year this is about 3,000 changes--a dreadful number. And what is behind the changes? Let us take a fresh issue of the index: the word "unifilar" is replaced by the word "single," "relative"--by "specific," "valves"--by "vents" (of a valve). Some changes are so massive that they take up in the books several pages each. As a result nothing is left of the initial edition. It happens that the changes anticipate the introduction of the All-Union State Standard itself. All this attests to low demandingness, which serves as the start of a chain reaction: the changes in the All-Union State Standards must be reflected in hundreds of thousands of standardized, planning and technical documents. And thousands, tens of thousands of engineers and technicians lose touch with creative labor. But the All-Union State Standard does not have the right to mistakes. It is all the more impermissible to duplicate them.

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CSO: 1814/146

PUBLICATION OF MATERIALS FOR SECONDARY SCHOOL COMPUTER COURSE

Moscow KNIZHNOYE OBOZRENIYE in Russian 5 Apr 85 p 4

[Article by D. Zuyev, director of the Education Publishing House: "The Computer Helps"]

[Text] In late March the Politburo of the CPSU Central Committee specified steps on the assurance of the computer literacy of students of secondary educational institutions and the extensive introduction of computers in the educational process. This decision of the party found extensive approval among teachers and students.

In connection with this important event teacher V. Sidirov (Moscow) writes:

"...I know that there are schools, at which lessons are conducted with the involvement of computers, not only here in Moscow, but also in many cities of the country. Of course, a large role in the successful mastering of computers belongs to specialized literature on this theme, which, unfortunately, for the present rarely appears on the shelves of the store. I will say that handbooks, in which various organizational methods recommendations on each class would be given, interest me as a teacher. I would like to find out about the plans of publishing houses with respect to this problem, which interests, I believe, not only teachers, but also pupils and parents."

In the decree of the CPSU Central Committee and the USSR Council of Ministers, which was adopted on this question, the introduction starting with the new school year at all secondary educational institutions of the country of the course "The Fundamentals of Information Science and Computer Technology" and the conducting of an extensive experiment on the use of computers in the teaching of school subjects are envisaged. It is planned to develop the course training of teachers for the teaching of this subject, to set up offices of computer technology at educational institutions and the organize the software and methods support of the educational process. Computers will be used extensively in extracurricular forms of work with students, in case of

the organization of creative technical work and in the activity of clubs, houses of Pioneers and palaces of culture. It was emphasized that the comprehensive and thorough mastery by young people of computer technology should become an important factor of the acceleration of scientific and technical progress in the country.

There is no need to speak about the importance of this work, for this is the prospect of the development of technology, this is in the end the efficiency and rate of development of our economy. It can be briefly said: the country has entered the age of the elimination of computer illiteracy, and the school should take a leading place in this work. It should be emphasized that we are starting far from scratch. About 20 years ago the first textbooks for the thorough mathematical training of school children in the mastering of the difficult occupation of programmer were published at the Education Publishing House.

In 1972 the first educational production combine, at which school children were trained in seven occupations, six of which were directly connected with the use, maintenance and software of computers, was established in Moscow.

Our publishing house told about the experience of this work, having published in 1984 the pamphlet "We Are Learning to Work With Computers," which was edited by A. V. Giglavyy.

This was the beginning, which was called upon to attract the attention of the pedagogical community at large to work with computers; to reveal the fundamentals of the principles of this work both from the standpoint of the increase of the interest of school children in the learning process and in the organization of the labor training of the rising generation.

And now a well-balanced and responsible program of the implementation of the order of the USSR Ministry of Education on the book supply of the universal computer education of students has been elaborated at the Education Publishing House.

The course "The Fundamentals of Information Science and Computer Technology" (the noncomputer version), which will be used in the 9th grade of the secondary school already in 1985, will be its foundation. This means that by the beginning of the school year we have to prepare and publish the program of this course, a trial textbook for the 9th grade in an edition of 3 million copies and a handbook for the teacher. This handbook will consist of two parts. The general ideas and goals of the new course and its interrelations with mathematics and other subjects will be revealed in the first. Lesson-by-lesson elaborations and organizational methods recommendations on each class are given in the second.

At the same time the editorial board of mathematics is continuing the work with a collective of authors headed by Academician A. P. Yershov and Academician of the USSR Academy of Pedagogical Sciences V. M. Monakhov on a trial textbook for the 10th grade in order to develop a textbook for the subject by the 1986/87 school year.

The program is most intense. The time is calculated in hours and is scheduled by operations. Thus, at present the cover of the handbook has been approved, and we will begin to print it at two printing combines, thereby saving every day.

At the same time in 1985 the publishing house is publishing several pamphlets for students. They are "Programming on an MK-64 Microcalculator" (the author is I. N. Antipov) and "Microcalculator for the Pupil" (the authors are well-known educational methods specialists N. Ya. Vilenkin and S. I. Shvartsburg). These pamphlets will give the pupil an idea of the principles of the operation of this most simple, but exceptionally useful computer and will reveal the possibilities which it makes available to the pupil.

The pamphlet of a collective of authors under the supervision of K. V. Lyubimov "The Microcalculator in 7th Grade Physics Classes" will serve this goal, but already in a specific, subject application. On the basis of specific examples of the study of the fundamentals of physics and mathematics, the guide will help the pupil to master operations on the input of numbers in natural and standard form, the addition and subtraction of numbers, their multiplication and division, operations with brackets and the solution of quadratic equations. For the mastering of each operation the authors developed programs and the corresponding exercises.

Written in simple, easily understood language, the guide will give the pupil the opportunity to find in the microcalculator his own good assistant.

At the same time the publishing house will also help the teacher in mastering this means of instruction, which is new for him. In 1986 there will be published: the series of procedural guides "The MK-64 Programmable Microcalculator" of Yu. K. Kuznetsov, "Procedural Recommendations on the Use of the MKSh-2 Microcalculator" of a collective of authors under the supervision of M. N. Shamshurin, "The Equipment of the Office of Computer Technology at the Secondary School" and pamphlets from the experience of specific teachers.

The publishing house is now seeking collectives of authors, who will be able not only to acquaint the teacher with the general problems of this work (for example, "The Theoretical Principles of Computer Technology," "Computer Technology and the Teaching of Mathematics: Experience and Prospects"), but also to present it in specific educational subjects.

Thus, Professor V. A. Izvozchikov and teacher and educational methods specialist A. D. Revunov submitted to the publishing house the book "Elektronno-vychislitelnaya tekhnika na urokakh fiziki" [Computers in Physics Lessons], in which it is proposed to generalize both the domestic and the foreign experience of this work and to give recommendations with allowance made for the educational psychological problems of the use of computer technology. There are interesting applications in the editorial board of pedagogy on the use of computers in the vocational guidance of school children; they are also thinking over these questions in the editorial board of Russian.

And, of course, it is necessary to devote proper attention to the training of the future teacher. A collective from six pedagogical institutes of the RSFSR, Belorussia and the Ukraine is now involved in this work and it is being conducted under the general supervision of Professor V. S. Yampolskiy. I am confident that the first attempt will find its followers.

Returning to the problems of the school, I will note that for the course of the in-depth teaching of the subject with the enlistment of hours, which have been assigned for labor education, we have to develop handbooks for the training among students of computer programmers, since all the work on the elimination of computer illiteracy will require the development of a large number of programs. But for this personnel will be needed and literature for the training of experts in the debugging and use of microcalculators and other computer technology will be needed.

The collective of the Education Publishing House understands all the responsibility which rests with it in the organization of this work. I am confident that we will cope with it.

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CSO: 1814/178

PROBLEMS OF SUPPLY OF INFORMATION TO SCIENTISTS

Moscow SOTSIALISTICHESKIY TRUD in Russian No 2, Feb 85 pp 38-43

[Article by I. Dreytser, chief of a department of the Kuznetsk Affiliate of the NIOGR: "The Information Rear of Science"]

[Text] The scientific and technical revolution knows how to do everything. Our professional consciousness assimilates this thesis as something that stands to reason: for nearly every day brings new evidence of this. Science in practice is becoming an immediate productive force, confirming the brilliant prediction of the inevitability and regularity of this, which was formulated by Marx more than 100 years ago.

At the same time it must be admitted that the all-powerful scientific and technical revolution for the present has obviously not yet realized all its potentials. For example, about 50 million workers are employed in our country in unappealing manual labor, and not always easy labor. And the situation with so-called mechanized labor, alas, is not as good as would be wanted. But, in spite of this, there are no doubts about the main thing: the radical transformation of science and technology, their relations and social functions are the basic prerequisite of the further growth of the productive forces. "The main way to a qualitative change in the productive forces," the June (1983) CPSU Central Committee recalled once again, "is, of course, the changeover to intensive development, the combination in practice of the advantages of our socialist system with the achievements of the scientific and technical revolution."

Precisely for this reason the task of increasing the quality and effectiveness of scientific research was posed for our science. Under the conditions, when the reserves of its extensive development have practically been exhausted, the search for means of substantially increasing productivity is becoming a matter of prime importance. In short, science itself needs intensification. Here are a few figures. In the past 60 years labor productivity in physical production, according to some data, has increased by approximately 10- to 12-fold. In the labor of a researcher this indicator has not exceeded 60 percent. Of course, such a lag cannot but hinder the changeover to the intensive means.

In characterizing the successes of science, which has become an immediate productive force, it is customary to emphasize the increase of such a parameter of the scientific potential of the country as the number of personnel. Of course, this indicator along with the material base of the given sphere, the level of skills of researchers, the organizational structure of scientific institutions and others is among the most important. At the same time, when it is a question of the development of science, such a parameter of it was the information supply of researchers assumes particular importance. Just as in physical product the level of the machine-worker and power-worker ratios characterizes the possibility of society to solve the problems of strengthening the economy, so here the supply with information predetermines the success of scientific and technical progress. Information is the basic object of labor of the scientist (as is, incidentally, its final product).

Meanwhile, the procedure adopted in the country of evaluating the scientific and technical activity of research and development organizations (it originated 10 years ago and since then has not changed), in our opinion, does not stimulate the increase of information supply. In that section of the prevailing method of evaluation, in which it is a question of the scientific and technical potential of organizations, the availability and size of information services are not stipulated, it is recommended to judge the completeness of the reference and information holdings only by patent documents--an important, but not the only component of them. But the conducting of research and development, the goal of which is to create a scientific reserve, which is spoken about in the same paragraph, requires the most careful information preparation. And, of course, one must not confine it to a patent survey. Moreover, only the corresponding specialists can perform this very responsible and labor-consuming work, which this method also does not take into account. But without skilled patent experts any, even the most representative, collection is silent. Only being committed to the scientific turnover by the efforts of man, it has an influence on the level of research and development.

One of the adverse consequences of the current scientific and technical revolution, as is known, consists in the fact that a quite complicated situation has developed on "the market of knowledge": the search for the necessary information is accompanied by significant labor expenditures (according to some estimates they amount of 40 percent of the workday of a researcher). The next division of labor in science is due to the needs of its "explosive" growth: specialized services, the main point of whose existence is to supply the researcher with the necessary information, have emerged. In our country certain gains have been made in the development of this new area of the application of labor. A quite well-balanced system, which ensures the publication and dissemination of scientific and technical information at several levels, has been established.

At the lowest level of this complex hierarchy are the services of scientific research and planning and design organizations, that is, those units which are directly called upon to look after the completeness of information for researchers and developers. And if today one still has occasion to complain at times about the insufficiently high level of individual studies and even

entire directions of science, while the obtained results at times lag behind the world level, one of the essential reasons here (but not the only one, of course!) is the inadequate information of researchers and a number of costs of an organizational nature.

Information science proper--the discipline on the laws of the process of the retrieval, reduction and optimum presentation of information, and the science of science--an intensively developing field of knowledge, which studies an entire set of questions, including those connected with the organization of the labor of researchers, are also studying the means of optimizing the information supply of science. Certain gains have been made in each of these directions. Suffice it to name the operations in the field of information science, which are being performed at the All-Union Institute of Scientific and Technical Information, or the results obtained by Ukrainian scientists of science of the school of Professor G. M. Dobrov. Meanwhile, complaints of the inadequacy of information are still being heard.

It seems that the root of evil here should be sought in the too large a gap between scientific recommendations and the practice of the organization of the information process, the level of its technical supply. And first of all the inadequate number of workers employed here and the low reliability of the information rear of science tell. The corresponding subdivisions in the structure of its institutions are assigned to auxiliary scientific services, and under the conditions of a constant shortage of personnel for the fulfillment of the thematic plan they are always the smallest. Apparently, it is time to recognize that given such an intensive increase of information the existing standards of the size of such services (in the coal industry, for example, they are within the limits of 3 percent of the number of scientists) no longer conform to the needs of research activity.

Other factors, particularly the inadequate prestige of labor in this area, as well as its lower remuneration than that of scientific personnel also have a substantial effect on the quality of the information process. A young specialist in a scientific laboratory has the opportunity to become familiar very quickly with the study of some special question and to obtain independently results which can be made the basis for a future dissertation. The staff member of an information service lacks all this: work on minor themes and chores do not enable him to engage even in the compilation of a survey. That is why the information services have to be manned at times with casual people who do not have a good vocational training.

Information services are relatively young structural formations within institutions of science. In reality such specialized subdivisions began to emerge at scientific research institutes in the late 1950's and only by 1962 was this process completed organizationally. And the very formation of the corresponding field of knowledge was over in practice already in the 1960's. Suffice it to say that the term information science, which designates this sphere, appeared only in 1966. As in any new area of the application of labor, in the spheres responsible for the support of the information rear of science the intensive search for efficient forms of organization occurred, methods and means were developed and a standard base was built up. This

process occurred quite slowly and, unfortunately, not always productively. One should seek the basic reason, apparently, in the very rapidly established stereotype of the evaluation of such services as secondary, to a certain extent optional services.

This found expression first of all in the arbitrariness of their formation and even designation. The diversity of structures, behind which their different functional content filling lies, complicates the process of the planning and coordination of operations on the information support of themes and, what is more, the very manning of such services, which became particularly obvious after the USSR State Committee for Science and Technology approved the standardized procedure of planning.¹ Indeed, the group of tasks and duties, which are assigned to these subdivisions, as a rule, is quite broad--from scientific information ones proper to registration ones. Frequently they deal both with patent and license work and with questions of standardization.

Moreover, the information process requires specialists of different types--engineers and economists, patent experts and translators, editors and proofreaders, bibliographers and librarians. And, consequently, the organization of their joint labor in itself is already a difficult task. It is not by chance that even at the Institute for the Increase of the Skills of Information Workers (IPKIR) of the State Committee for Science and Technology there is no integral management course for the managers of these services, while the set of individual special courses characterizes only different aspects of the organization of the mentioned process.

It is also impossible not to note such a circumstance which to some extent reflects the actually formed status of information services. Periodic training has not yet become as mandatory for their personnel as, for example, the system of sectorial institutes for the increase of skills requires of scientific associates, although the workers of information services do not receive at all regular vocational training in the area of equipment, technology and the organization of the information process at the higher school. Consequently, the classes at the Institute for the Increase of Skills are for them the only opportunity to acquire such knowledge.

Under the conditions of the limited size of information services their staff members have to be in charge of several different directions, which requires of the curator broad erudition. Not by chance, for example, in the United States are the information analysis centers--fundamentally new information structures which have assumed in part the functions of researchers--manned, as a rule, with actively working professionals--scientists and engineers. These specialists maintain the closest contact with their technical occupations and can carry out the synthesis of new data.

By filling in the information services the basic positions with a small number of specialists with low pay, are we not losing such a saving? The researcher as it is has to perform significant amounts of routine, uncreative work--the ratio of basic and auxiliary personnel at institutes is far from optimal.² And in such a situation the good information preparation of themes serves as an important level of the intensification of scientific labor. At the same time the costs here continue to remain significant, and one of the main ones

is the insufficiently high effectiveness of the influence of scientific and technical information services on the end results of research.

Precisely for this reason, for example, library bibliographical processes--which in themselves are very important, but do not conform either in the level of difficulty or in the potential impact to the nature of scientific information activity--so far predominate in information work. But then the more complicated procedures of the reduction of information, such as, say, the preparation of various types of surveys, for the present are still a rarity in the local information services and continue to remain the prerogative of specialized all-union institutions like the All-Union Institute of Scientific and Technical Information, the Institute of Scientific Information on the Social Sciences and others, without having been included in the practical work of even the central sectorial information organs.

Incidentally, about the latter. The possibility of increasing the efficiency of information supply also still exists here. Today a turn primarily to publishing work--undoubtedly, a very important, but, of course, not the only type of activity--has been made at these institutes. Frequently it proves to be quite difficult, lest to say hopeless, to obtain other services. For example, in the local information services many reproaches arise with regard to the inadequate efficiency of the main information institute of the coal industry--the Central Scientific Research Institute of Economics of the Coal Industry. Meanwhile it is legitimate to expect from such an institute the greatest assistance to research and development organizations. The optimum conditions for this have been created (or at least should be created) at it: exhaustive sectorial reference and information holdings, on the basis of which it is possible both to make a search in accordance with any order and to carry out various types of the reduction of information, are being accumulated here.

The change of some emphases in the activity of such sectorial organs seems reasonable and urgent. In particular, it would be worthwhile to review the advisability of publishing abstract collections. The point is that their information potential is very limited. On 4-5 pages of text it is very difficult without detriment to the comprehension to present the essence of a conducted study, including the details of the method, and the basic scientific results which were obtained here. The publication of similar collections could be concentrated in the All-Union Institute of Scientific and Technical Information or could simply be abolished, taking into account the existence of an abstract journal, the corresponding series of which fit the needs of practically all sectors of the economy. Probably, it would be wiser to increase the sizes of the sectorial journals like UGOL.

The surveys and rapid information, which are published at sectorial information institutes, also need some content and structural reorientation. The analysis shows that the majority of them (at least in the coal industry) conform little to their tasks. These materials most often contain a description of a completed scientific study or advanced production know-how, it is not possible to obtain from them a systems idea about the status of one question or another and about the trends which are coming to light during its elaboration in various countries.

Perhaps, the insufficiently great efficiency of the activity of sectorial information institutes to some extent is explained by the fact that their economic subdivisions are composite and deal with scientific and technical information along with technical and economic research. But it is hardly legitimate to justify by these reasons the lag of one of the directions, especially as technical progress in the sectors in many respects depends on its proper organization. It seems more useful to us to concentrate the efforts of sectorial institutes on the rapid retrieval and reduction of information in accordance with specific requests of scientific research institutes and planning and design institutes (design bureaus), that is, those organizations for which it is vitally important. It is a question in reality of the need to create a reliable system of the information supply of thematic plans. In the end knowledge of the world level of the development of the corresponding section of science and technology is a most important prerequisite of the success of research and development.

Today at the same Central Scientific Research Institute of Economics of the Coal Industry, for example, they are still simply not ready, apparently, for such a reinterpretation of the tasks. Thus, at the very beginning of the current five-year plan, when formulating the thematic plan, we addressed to this institute the request to prepare a survey of domestic and foreign sources on one theme, the dates, on which we wanted to receive it, were stipulated. But it was never possible to convince the responsible official of the institute that the information service being requested should pass through this "department." Meanwhile, in the Model Statute on the Central Scientific Research Institute of Information and Technical and Economic Research of the Ministry (Department) of the USSR among the basic tasks and functions there is also the following one: "...organizes in conformity with the theme of the institute the preparation of SURVEY INFORMATION [in boldface] (emphasized by me--I. D.)...."³

The situation which has formed today in science (no one doubts this any more) urgently requires the transition to a qualitatively new level of the technology and organization of the retrieval and processing of information, particularly the development of automated information retrieval systems. However, in the country the number of such efficiently operating systems for the present is still very small (a little more than 10 at the 89 sectorial information centers). And the level of "intellect" of those which are already in operation does not make it possible to analyze the gathered set of data, this most important procedure for the present has still been given entirely to man, although the idea of its automation is not that incredible.

The rate of the processing of information is decreasing noticeably due to the language barrier which for the present is difficult to overcome. At the same time it is impossible to recognize as satisfactory the support of the information process by specialists who know foreign languages, especially as the possibilities of machine translation for the present are still very limited. The already mentioned meagerness of the staff of information services does not make it possible to man them with a sufficient number of personnel. Another matter is the lack of specialized organizations locally. The All-Union Center of Translations, which was established several years ago, of course, is not capable of rapidly filling all orders, especially if they

come from outside Moscow. Unfortunately, for incomprehensible reasons there are also no translation services at the territorial centers of scientific and technical information. As a result the foreign periodicals being accumulated, a portion of which are purchased for currency, are being used by no means in the best manner. But the difference in the "average age" of the domestic and foreign literature, which is being involved in the scientific turnover, comes to very impressive amounts. Does not one of the causes of the lag of many results lie here?

In examining the shortcomings of the system of scientific and technical information, one should point out the quite frequent irregularities in the work of interlibrary loan systems, the long time of the filling of orders by the All-Union Scientific and Technical Information Center and the intolerable slowness of the services of the All-Union Center of Patent Services. Apparently, the established system of publications merits reorganization. So far the task of creating in journals and publishing houses an effective barrier to materials, which do not contain new information, has not lost its urgency. The information overloads are explained, obviously, not so much by the absolute increase of new scientific knowledge as by the penetration of an abundance of duplicate data into scientific circulation.

And, finally, another important question is the training of the future users of information. As a result of the inadequate experience of the beginning researcher in face of its abundance at times a kind of psychological barrier also arises: Is it possible to find a needle in a haystack? It is necessary to overcome this barrier within the programs of higher educational institutions and to acquaint the students of the upper classes more extensively with the principles of information retrieval. Such knowledge is necessary in any area of the application of labor, but it is especially valuable for the future researcher and developer. Today chairs of scientific information exist at only a few higher educational institutions of the country, at very few special courses have been introduced in nonspecialized chairs. This experience should be made accessible to others.

The task of increasing the efficiency of the labor of the research, undoubtedly, is not confined to his more completely information supply. Just as, incidentally, it is correct that it is not enough, for example, only to improve the material base of science. Success is possible only in case of a comprehensive approach. The labor of the scientist is an important national resource, and one should use it very assiduously.

FOOTNOTES

1. See "Planirovaniye v gosudarstvennoy sisteme nauchno-tehnicheskoy informatsii (Metodicheskiye ukazaniya)" [Planning in the State System of Scientific and Technical Information (Procedural Instructions)], Moscow, 1983.
2. This problem has already been discussed on the pages of SOTSIALISTICHESKIY TRUD (see the report on the round-table meeting, No 9, 1982).

3. "Sbornik rukovodyashchikh materialov po nauchno-tehnicheskoy informatsii"
[A Collection of Reference Materials on Scientific and Technical
Information], Moscow, 1975, p 73.

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CSO: 1814/147

UDC 621.3-523.8: 658.3-057.3

AUTOMATED MANAGEMENT SYSTEM OF COMPUTER CENTER

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVA in Russian No 12, Dec 84
pp 31-32

[Article by Doctor of Economic Sciences V. N. Podolskiy and Candidate of Economic Sciences N. G. Antonov: "The Improvement of the Organization of the Management of Computer Centers"]

[Text] The further development of the work on the creation of automated control systems of enterprises, sectors, technological processes and others is one of the basic directions in the introduction of computer technology (VT) in the national economy.

At present there are more than 6,000 automated control systems of various levels and purposes in the country. The experience of the operation of the automated enterprise management system and the sectorial automated management system, which were developed on their own technical base, showed their great efficiency: the system of the management of both industrial enterprises and sectors of the national economy has been improved significantly.

Positive results have been achieved in the area of the development of automated systems for the control of technological processes, ASUTP's. The payback period of automated systems for the control of technological processes on the average comes to 1.2 years, here the optimization of the operating conditions of equipment, technological lines and works is ensured, the quality and quality of the output being produced increases.

The impact in case of the integration of automated enterprise management systems and automated systems for the control of technological processes is especially appreciable. Such a direction is promising, it is being developed on the basis of the complete use of computer technology, which controls, on the one hand, technological processes and, on the other, the section, the shop and the plant. The ZIL Production Association, the Moscow Vtoroy chasovoy zavod Production Association, the Khromatron Plant and others are examples of the achievement of a great efficiency of the complete use of computer technology.

Prior to the middle of the 1980's computer technology mainly was introduced according to the departmental-sectorial principle, primarily at individual

enterprises, organizations, departments and ministries. As a result individual forms of the use of computer technology, including computers, began to predominate.

The distribution of computer technology among many enterprises and organizations led to its significant shortage. The stock of computers in our country steadily increased.

The use of computer technology in the national economy in the form of the establishment of computer centers (VTs's), which are carried on an independent balance sheet (cost accounting centers), and collective-use computer centers (VTsKP's) is most expedient. The uniting of various computer centers by communications channels for the performance of large amounts of information and computing work is a promising direction of the development of networks of computer centers.

Large collective-use information and computing systems, which include various types of computer centers, are a prerequisite of the formation of the special sector of information and computer service. Enterprises for information processing, which are equipped with computer technology and are intended for the performance of complicated and labor-consuming computing operations, are included in the sector.

A complex organizational structure with a large number of subdivisions and a stage nature of information processing (the subdivisions gather data which are processed by computers) is characteristic of computer centers. The number and capacity of each subdivision are strictly balanced, here the capacity of the computer is the basic restriction. The inadequate mechanization or automation of a separate section (a low level of provision with equipment and manpower resources, irregularities in supply) can decrease sharply the efficiency of the work of the entire enterprise for information processing. The majority of such enterprises at present operate on a cost accounting basis.

The centralized use at enterprises of computers, communications systems and personnel (economists, programmers and various specialists in the servicing of the computer system) frees subscribers from many worries about the operation of computer technology and promotes the increase of the efficiency of its use and the increase of the quality of the services being offered.

For the achievement of a high quality of the services, which are made available in the area of data processing, it is necessary to improve the system of the management of enterprises for information processing. At present the Statute on the Socialist State Enterprise applies to these enterprises. The planning, norm setting, accounting and regulation of occurring computing processes are the basic functions of their activity. The increase of the scientific level of the planning and accounting of computer centers can be achieved by means of mathematical economic models and electronic computer technology. It is necessary to include in the automated management system of the computer center the automation of the control of the computing process and the economic organizational and production activity of the computer center--a large enterprise for information processing.

Special properties distinguish the production activity of the computer center; they appear in the nature of labor--in the development of program products and the obtaining of the end results of the process of information processing; in the conditions of the occurrence of computing processes; in the use of fixed production capital (computer equipment, means of communication, office equipment and others).

The accomplishment of the following tasks on the management of the production activity of the computer center is assigned to the automated management system of the computer center: the long-range, technical and economic and day-to-day production planning of the production activity of the computer center; the efficient accounting and analysis of the actual state of resources and of the operations included in the plan; the efficient regulation of the occurrence of the computing process; the keeping of a set of norms and standards, which are used at computer centers, the accounting and analysis of economic operations at the computer center; the gathering and processing of statistical data on the progress of the computing process. The results of the processing of "statistics" are needed for the decrease of the losses of all types of resources, the increase of the output of products, the increase of labor productivity--the improvement of the technological process.

In case of the organization of production operations a portion of the tasks can be performed directly on computers, since their operating systems carry out the functions of the distribution and accounting of computer resources. The value of the resources is very high and, as a consequence, foremost importance should be assigned to their management at the computer center.

Reliable information, which reflects all aspects of the production operations of the computer center, its subdivisions and individual workers, is needed for the development of an automated management system of the computer center. The obtaining of information and a number of other functions can be assigned to the automated management system. The displays carry out the exchange of the operational information which is found in the subdivisions. The development of the automated management system of the computer center makes it possible to obtain the following rapid information on expenditures: the time and performed amounts of work in the subdivisions of the receipt and issuing of information; the time and performed amount of work, the labor productivity of operators, as well as the useful operating time of equipment in the subdivisions of the preparation of information and the duplication of documents; the useful computer time in the subdivisions of the service of computer equipment; the equipment for the performance of the operations on the formulation of mathematical economic models and programming.

The analysis of the experience of a number of computer centers shows that the automated management system of the computer center includes the following functional subsystems: long-range planning; technical and economic planning; operational production planning; the management of the computing process; the management of computer resources; the accounting and analysis of economic operations; the management of finances; the management of personnel; the monitoring of the process of the fulfillment of the jobs circulating at the computer center; the statistics of the activity of the computer center.

The basic purpose of the subsystems consists in the following. The subsystem of long-range planning serves for the determination of the development and the improvement of the production and technical characteristics of the computer center for the long-range future. The subsystem of technical and economic planning includes the drafting of annual and five-year plans, the making of calculations on the basic sections of the technical, industrial and financing plan.

In the subsystem of operational production planning the plans of technical and economic planning are detailed, specified and reported to each workplace. Operational production planning is carried out at each computer center. Its basic tasks are: the completion of the production process on information processing; the assurance of the uniform receipt of information; the prevention of idle times of computers and personnel; the strict coordination of all the operations of the technological process of information processing; the timely putting out of reports. Schedules of the movement of information by stages of the processing, receipt and issuing of information, as well as the utilization of equipment, personnel and computers and the work schedule of the computer center are drawn up in the subsystem.

The subsystem of the management of the computing process maintains the continuous process of information processing and the uniform utilization of workplaces and production sections. The subsystem of the management of the computer resources of the computer center is intended for the efficient distribution and accounting of the resources which are at the disposal of the computer center.

The solution of accounting problems, including the accounting of fixed assets (capital), physical assets, labor and wages, finished products and their sale, settlement and financial operations and others, is carried out in the subsystem of accounting and analysis. All the settlements for the operations performed by the computer center and the rendered services, as well as its interrelations with organs of the state bank, creditors, debtors, workers and employees are carried out in the subsystem of the management of finances.

The subsystem of the management of personnel is intended for the improvement of the work of the personnel division and the shortening of the time for the obtaining of information and reports, which are sent to the management of the computer center and superior organs. The increase of the level of the organization of the management of personnel, the prompt receipt of information on workers, the analysis of the supply of the computer center with manpower and the solution of the problems of the consideration of the returns on personnel are the goal of the establishment of the subsystem.

The subsystem of the monitoring of the progress of the fulfillment of jobs carries out the day-to-day checking of all the activity of the computer center and the timely delivery of jobs to the client. The subsystem of statistics accumulates data on the indicators of the activity of the computer center over a number of years (the data then undergo analysis).

In our opinion, the effect of intraplant cost accounting should be extended to the computer centers which are a part of the automated enterprise management

system. Under the conditions of the operation of such enterprises the need for a centralized system of planning, norm setting and accounting--the scientific organization of activity, unified approaches to the designing of various types of supply--is intensified.

However, it is advisable to accomplish in the corresponding subsystems of the automated enterprise management system the tasks on technical and economic and operational production planning, as well as a number of tasks on material and technical supply and accounting. This is due to the fact that the algorithms of the solution of the problems of the computer center and the automated enterprise management system do not differ substantially.

Thus, the introduction of the automated management system of the computer center at computer centers of different levels and purposes will make it possible to improve significantly the utilization of equipment, to use computer technology efficiently, to optimize technological processes, to eliminate the idle times of computers, to eliminate peak loads, to improve the supply of computing processes with all types of resources, to increase labor productivity and to decrease the number of workers, to increase the amount of information being processed and to improve qualitatively the system of the management of the computer center.

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CSO: 1814/175

INTERNATIONAL S&T RELATIONS

INTERNATIONAL COOPERATION IN POWDER METALLURGY

Minsk SELSKAYA GAZETA in Russian 26 Mar 85 p 3

[Article (BELTA): "Strengthen Cooperation"]

[Text] In recent years in the leading countries of the world powder metallurgy has developed five- to sixfold more rapidly than the production of steel and pig iron. This fact was heard on 25 March in Minsk at the opening of the seminar of the UN Economic Commission for Europe on the development and use of powder metallurgy in machine building. On the invitation of the republic government specialists, scientists and managers of firms from Austria, England, Bulgaria, the GDR, Sweden, Switzerland, the FRG, the United States and other member countries of the Economic Commission for Europe came to the capital of Belorussia. Together with representatives of the Soviet Union for 5 days they will exchange experience and information on the development of the latest equipment and technologies and will discuss the economic and social aspects of the sector, its prospects and the problems of international cooperation and trade.

Opening the seminar, O. G. Belorus, director of the Industry and Technology Department of the Economic Commission for Europe, noted that the representative meeting of specialists will give new impetus to scientific research and international cooperation in this promising direction for modern production.

Deputy Chairman of the Belorussian SSR Council of Ministers V. I. Kritskiy warmly greeted those who had gathered.

Soviet specialists will be the authors of half of the 50 reports which will be heard at the working meetings of the four sections. Belorussian scientists will deliver nine reports. The prestige of their scientific research is confirmed by 19 patents which have been obtained abroad and by licenses which have been sold to several foreign firms. At the plenary meeting it was noted that the first Republic Scientific Production Association of Powder Metallurgy in the USSR, which is making it possible to unite the efforts of scientists and experienced workers in the elaboration of the most important problems, is operating successfully in Belorussia. The republic has multilateral relations with the CEMA member countries in the conducting of scientific research and the development of materials, technologies and equipment in the area of

obtaining powders, contacts with many foreign firms and organizations are being developed. These efforts of Belorussian scientists have been commended by the international Gold Mercury Prize.

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CSO: 1814/146

CONFERENCES AND EXPOSITIONS

ANNUAL GENERAL ASSEMBLY OF LATVIAN SSR ACADEMY OF SCIENCES

Riga SOVETSKAYA LATVIYA in Russian 22 Mar 85 pp 1, 3

[Article (LATINFORM): "The Creative Energy of Science"]

[Text] The many-sided activity of the scientists of Latvia reflects the rapid pace of the development of Soviet science and its close contacts with the economy and social and public life of the country. Their new achievements and further tasks were discussed at the annual session of the General Assembly of the republic Academy of Sciences, which was held in Riga on 21 March. Academicians and corresponding members of the Latvian SSR Academy of Sciences, executives and leading associates of academic institutions, higher educational institutions and sectorial institutes and representatives of industry, agriculture and public organizations took part in it.

Comrades B. K. Pugo, V. I. Dmitriyev and Yu. Ya. Ruben, Deputy Chairman of the Latvian SSR Supreme Soviet V. A. Blyum, Deputy Chairman of the Republic Council of Ministers V. M. Krumin, Chief of the Science and Educational Institutions Department of the Latvian CP Central Committee V. S. Klibik and others are in the presidium.

In opening the General Assembly of the Latvian SSR Academy of Sciences, Academician B. A. Purin, its president, noted that the scientists of the republic, just as all the Soviet people, are increasing their creative and labor activity during the period of the preparation for the 27th party congress. They are devoting their labor to the strengthening of the economic might of the country and the increase of the well-being and culture of the Soviet people. The scientists of the academy unanimously approve of the decisions of the March (1985) CPSU Central Committee Plenum and have accepted for strict guidance the words spoken at it by General Secretary of the CPSU Central Committee Comrade M. S. Gorbachev: "We have to achieve a decisive turn in the changeover of the national economy to the path of intensive development. We should, ought in a short time to attain the most advanced scientific and technical positions, the highest world level of the productivity of national labor."

Scientific schools, which have received extensive recognition in the country and abroad, have been formed in Soviet Latvia. This pertains to a large number of directions of basic and applied research. The scientists of the

republic, for example, hold the leading position in such fields of modern science as the magnetohydrodynamics of incompressible media, the mechanics of rigid bodies and polymers, the plasma chemistry of inorganic compounds, the synthesis of biologically active substances and wood chemistry. Significant results have also been achieved in several other fields. The Presidium of the USSR Academy of Sciences examined and endorsed the scientific and scientific organizational activity of the Latvian Academy of Sciences, having particularly noted the effectiveness of jointly conducted developments. The research, which is aimed at the development of new materials, biotechnological processes, medicinal preparations and systems of the monitoring and control of production operations and scientific experiments, has found such a form.

At present the academy is participating in the fulfillment of 30 comprehensive programs of union importance and 16 republic programs. Difficult tasks face it. And in order to cope successfully with them, a self-critical approach to the work is necessary. The activity of the scientific institutions is not without substantial shortcomings and oversights, to which it is impossible not to direct attention. Their potential for the solution of the vital problems of the intensification of social production is still not being fully utilized. Applied research should play a more significant role in the acceleration of scientific and technical progress in the country. At the same time it is necessary to increase the proportion of the scientific achievements which are being introduced in the national economy of the republic. Scientists cannot remain indifferent to the fate of their developments. One should persistently strive for their advancement into practice and the large-scale use of everything that is capable of increasing labor productivity and the quality of the output being produced.

As is known, the coordination of all research in the area of the natural, technical and social sciences has been assigned to the academy. But for the present this is not being done actively and persistently enough, especially with respect to the sectorial institutes which are subordinate to different ministries and departments. Another question is becoming more and more urgent--the strengthening of the experimental base of the academy. It is impossible to tolerate the fact that from year to year the construction of new facilities and the renovation of existing ones are being postponed.

It is necessary to continue the concentration of the scientific forces and resources of the academy on large research complexes, on which the success of many initiatives connected with the Food, Energy and other most important programs depends. This affords great possibilities, and it is necessary to fully realize them. Then the return of scientific research will increase and the direct contribution of scientists to the acceleration of scientific and technical progress will become more significant.

Chief Scientific Secretary of the Presidium of the Latvian SSR Academy of Sciences and Hero of the Soviet Union Academician V. P. Samson delivered the report on the basic results of the scientific activity of the academy for 1984. The plan assignments and socialist obligations of the year under review, he reported, were completely fulfilled.

Encouraging news was received: the Institute of Microbiology imeni A. Kirkhenshteyn took first place in the All-Union Socialist Competition of Institutes of the USSR Academy of Sciences and the Academies of Sciences of the Union Republics. The collective was awarded the Challenge Red Banner of the Presidium of the USSR Academy of Sciences and the Central Committee of the sectorial trade union.

For the Physical and Technical Sciences Department the Physics and Power Engineering Institute, for the Chemical and Biological Sciences Department the Institute of Microbiology imeni A. Kirkhenshteyn, for the Social Sciences Department the Institute of Economics and among the enterprises of the academy the experimental plant of biochemical preparations were the winners of the socialist competition in the Latvian SSR Academy of Sciences.

Associates of the academy are among the winners of the USSR State Prize and the prizes of the All-Union Komsomol and the Leninist Komsomol of Latvia. At various exhibitions the institutes were awarded 27 medals and 41 certificates.

In accordance with the results of scientific research for 1984 in case of their full implementation at enterprises and organizations of the republic 2,000 people can be freed. Introducing activity as compared with preceding years increased. The national economy has now assimilated 160 developments of Latvian scientists. In a number of cases the series production of proposed items has begun, which will have a positive effect on the economy of entire sectors. In 4 years of the five-year plan a total of 470 developments were completed, but of them for the present only one-tenth have found extensive application.

At the meeting of the republic party aktiv, which was devoted to the tasks of accelerating scientific and technical progress, it was indicated that the Academy of Sciences and higher educational institutions are still taking inadequately into account the needs of the national economy of the republic. It must be admitted, the speaker said, that we have actually done little so far in this direction. Latvian enterprises and organizations are involved in only one-third of the contracts which were concluded during the year under review by academic institutes. It is necessary to correct the formed situation.

Further the speaker characterized the most important results which were achieved by the scientific collectives of the academy. Their achievements testify to the close interconnection of basic and applied developments. Thus, a technology of the electromagnetic influencing of the processes of the growth of monocrystals was developed at the Institute of Physics. New devices for the orientation of parts on conveyors--components of a robotized complex--were produced here. The research on radiation, nuclear and theoretical physics is being conducted at a high theoretical level.

Specialists of the Physics and Power Engineering Institute developed indicators for evaluating the efficiency of the conversion of electric power and devised a set of programs for the search for efficient solutions when designing power systems. The studies of organic semiconductors, which are well known both in the USSR and abroad, led to substantial results.

Latvian scientists bear a large share of the responsibility for the development of computer networks. A pilot section of the information exchange system--with centers in Moscow, Leningrad and Riga--began to operate. The basic functional devices for multichannel communication between computers were produced and checked. The principles of the transmission and processing of images were studied. The Institute of Electronics and Computer Technology has all the means to accomplish more rapidly the tasks facing it. It is necessary to speed up significantly the placement into operation of the model computer network in the system of the Latvian SSR Academy of Sciences, then on the scale of the entire republic, the Baltic region and the academic institutions of the country.

The Institute of Polymer Mechanics is the leading scientific center in the area of the mechanics of composite materials. Much attention is being devoted to their improvement, the improvement of the methods of producing items and components, the diagnosis of properties and the forecasting of the durability of polymers. An automated system for the study of the processes of the destruction of such materials was developed.

The scientific institutions of the chemical type are dealing with a wide range of questions which are of great practical importance. The optimum conditions of the plasma chemical synthesis of refractory compounds were determined and the structure of ultradispersed particles of nitrides was studied. The plasma technology of the reconditioning of 15 different parts, which are used in agriculture machinery, motor vehicles and textile equipment, was turned over to repair enterprises. New technological principles and means of the protection of metals against corrosion are also being introduced.

The search for physiologically active compounds among the analogues of natural substances is being conducted purposefully. New original preparations for cardiovascular, nervous, infectious and other diseases are arising. Several substances, which are intended for treatment practice and medical diagnosis, were obtained by genetic engineering methods.

The problems of the complete processing of the biomass of wood, straw and younger peat are being successfully solved. The previously developed technology of producing furfural was improved, which increased by 15 percent the yield of this important product. In Valmiyerskiy Rayon the Zilayskalns pilot enterprise, which will convert peat into valuable fodder substrates, is being built according to the plan of scientists. The construction time, however, has been dragged out intolerably.

Biologists and microbiologists are making a significant contribution to the development of agriculture and environmental protection. Effective biological methods and means of destroying plant pests and new fertilizers are being sought. A biotechnical system for large stock breeding complexes has been proposed. Biotechnological processes are now being developed with the assistance of scientists at the Ogre Sovkhoz and Uzvara Kolkhoz of Bauskiy Rayon.

Further the speaker dwelt on the most important research in the area of the social sciences. The Institute of Economics, he noted, has determined efficient forms of the management of the agroindustrial complex. The initial data for demographic forecasts with allowance made for the increase of the educational level of the population and the social changes resulting from scientific and technical progress have also been gathered.

A number of basic works on history were written. Among them are "Istoriya Latviyskoy SSR" [The History of the Latvian SSR] (a new, enlarged edition), "Kniga pamyati revolyutsionnykh bortsov" [A Book in Memory of the Champions of the Revolution] and others. The collection of letters of soldiers of the Latvian formations of the Red Army from the fronts of the Great Patriotic War received an extensive response among readers. The contribution of linguists and literary scholars to the development of the national culture of Soviet Latvia is on the increase. The research of all social scientists is finding a practical orientation. They are changing their methods of work, as the decisions of the 26th party congress and the subsequent CPSU Central Committee plenums require.

The school reform is at the center of attention of the Presidium of the Latvian SSR Academy of Sciences. Scientists are being enlisted in the settlement of such questions as the determination of the base enterprises for schools and the broadening of the knowledge of students in individual subjects, and in the writing of new textbooks and programs.

Concerning the scientific organizational activity of the academy, the speaker stressed the importance of further increasing the level of the inventing activity of scientific collectives. In 1984 more than 160 applications for inventions were submitted, and for 143 of them there are already decisions on the issuing of certificates of authorship. During the preceding 3 years of the five-year plan over 400 certificates of authorship and about 80 foreign patents were received. However, ideas capable of radically changing the customary, stereotype production processes are still not being advanced boldly enough. A portion of the suggestions for the national economy do not contain inventions, that is, in practice lack novelty.

Academician A. F. Krogeris, director of the Physics and Power Engineering Institute; Academician R. A. Kukayn, director of the Institute of Microbiology imeni A. Kirkhenshteyn; Academician V. A. Shteynberg, director of the Institute of Philosophy and Law; Academician P. I. Valeskaln; Corresponding Member of the Academy Ya. Ya. Liyelpeter, deputy director of the Institute of Physics; Corresponding Member of the Academy A. R. Veys, rector of Riga Polytechnical Institute imeni A. Ya. Pelshe; and Corresponding Member of the Academy Yu. R. Zakis, prorector of the Latvian State University imeni P. Stuchka, spoke during the discussion on the report.

Then scientific reports were heard. Deputy Chairman of the Council of Ministers and Chairman of the Republic State Planning Committee M. I. Raman, the winner of the F. Deglav Prize of the Latvian SSR Academy of Sciences, acquainted the people with the problems of goal program planning and management. Academician A. A. Drizul elucidated the historical significance

of the Soviet Baltic republics becoming a part of the USSR. Doctor of Historical Sciences V. I. Savchenko told about the participation of the workers of Latvia in the Great Patriotic War of 1941-1945.

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CSO: 1814/143

COOPERATION OF BALTIC ACADEMIES OF SCIENCES, LENINGRAD CENTER

Tallinn SOVETSKAYA ESTONIYA in Russian 9 Apr 85 p 3

[Article (ETA): "In the Interests of Science"]

[Text] The scientific institutions of the Estonian SSR Academy of Sciences are conducting joint research with the institutes of the academies of sciences, higher educational institutions and scientific research organizations of the Leningrad Scientific Center of the USSR Academy of Sciences and the Latvian SSR and Lithuanian SSR academies of sciences.

The sphere of the practical use of the results of such work in the area of the social sciences, the study of the atmosphere and space and the development of computer technology is expanding.

A conference of the presidents and chief scientific secretaries of the presidiums of the academies of sciences of the Soviet Baltic region and representatives of the Leningrad Scientific Center of the USSR Academy of Sciences began in Tallinn on 8 April.

The same day Secretary of the Estonian CP Central Committee R. Ristlann received N. Pshirkov, deputy chairman of the Council for the Coordination of the Scientific Activity of the Academies of Sciences of the Union Republics; Academician of the USSR Academy of Sciences N. Solomenko, first deputy chairman of the Presidium of the Leningrad Scientific Center of the USSR Academy of Sciences; Academician of the USSR Academy of Sciences Yu. Pozhela, president of the Lithuanian SSR Academy of Sciences; Corresponding Member of the USSR Academy of Sciences B. Purin, president of the Latvian SSR Academy of Sciences; and Corresponding Member of the USSR Academy of Sciences K. Rebane, president of the Estonian SSR Academy of Sciences.

The conference participants familiarized themselves with the work of a number of institutes of the Estonian SSR Academy of Sciences and visited the Model Support Fishing Kolkhoz imeni S. M. Kirov.

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CSO: 1814/146

ANNUAL GENERAL ASSEMBLY OF ARMENIAN SSR ACADEMY OF SCIENCES

Yerevan KOMMUNIST in Russian 12 May 85 p 2

[Article: "At the Annual General Assembly of the Armenian SSR Academy of Sciences"]

[Text] The role of science in the intensive development of all the sectors of the national economy is great. The increase of the effectiveness of scientific research is an enormous reserve in the implementation of the socioeconomic plans of the country. As General Secretary of the CPSU Central Committee Comrade M. S. Gorbachev noted at the April (1985) CPSU Central Committee Plenum, the basic task of modern science is to promote with the greatest activeness the scientific and technical progress of the country.

In light of this demand of the party within the framework of the annual General Assembly of the Armenian SSR Academy of Sciences and at the meetings of its departments the results of the gains, which were made during the past year by the subdivisions of the main "headquarters" of science of the republic, were summarized and the problems of the further organization of work were discussed.

At the institutes of the department intense work was performed on the further development of scientific research and the strengthening of the material and technical base, G. Garibyan, academician secretary of the Physical and Mathematical Sciences Department, said in his report. Observations and the processing of the spectrograms of the Astron orbital telescope with the use of a wide-angle camera were continued at the oldest and most honored institute--the Order of Lenin Byurakan Astrophysics Observatory. The preparation for the development of a new medium-diameter orbital telescope is being carried out.

The properties of the Messbauer effect, which was modulated by acoustic waves, which can be used extensively in scientific research and the national economy, were studied at the youngest institute--the Institute of Applied Problems of Physics.

At the Institute of Mathematics the work of probability theory was continued, at the Computer Center the work on the automation of scientific research was continued.

"During the past year the institutes of the department completed a large number of themes, which should be introduced in the national economy during 1985," said Academician of the Armenian SSR Academy of Sciences M. Kasyan, deputy academician secretary of the Physical and Technical Sciences and Mechanics Department. The majority of institutes have within them special design bureaus and the production base for the making of prototypes. Joint work is being performed with scientific centers of the CSSR, Hungary, Poland and other countries.

Many interesting developments were carried out by the collectives of the Institute of Radio Physics and Electronics, the Institute of Mechanics and the special design and technological institute in Leninakan.

In his report A. Nalbandyan, academician secretary of the Chemical Sciences Department, spoke about the work of its scientific collectives. The activity of the institutes was governed by the further improvement of the organization of scientific research, the increase of the efficiency of work and the acceleration of the introduction of the obtained results. In 1984 the institutes broadened significantly their participation in the fulfillment of eight all-union comprehensive goal programs and programs on the solution of the most important scientific and technical problems, as well as in the fulfillment of the USSR Food Program, the program on environmental protection and the efficient use of natural resources, research on physical chemical biology and biological engineering. Suggestions on the comprehensive program of the scientific and technical progress of the Armenian SSR for 2010 were prepared.

The cooperation of the institutes with sectorial enterprises and institutions was broadened.

In speaking about the basic results of the activity of the Earth Sciences Department, Academician of the Armenian SSR Academy of Sciences A. Gabriyelyan, academician secretary of the department, noted that the year under review was effective for the Institute of Geological Sciences and the Institute of Geophysics and Seismology Engineering. Their collectives conducted research on 21 problems. Maps of the crystalline basement of the territory of the republic, its natural conditions and natural resources were made.

The collectives of the scientific institutions of the Biological Sciences Department, Academician of the Armenian SSR Academy of Sciences V. Kazaryan, academician secretary of the department, said in his report, should do much on the protection of the plant and animal world of the republic and their efficient use. The Institute of Botany jointly with the Armgiprozem [not further identified] elaborated forest reclamation projects, the implementation of which will significantly prevent soil erosion in the republic. Unfortunately, however, these projects for the present are not being implemented. Serious measures on the restoration and improvement especially of oak and beech groves, as well as plantings of medicinal, essential oil and wild edible plants, dye plants and other resources of the flora are required.

The activity of the institutions, which belong to the History and Economics Department, was developed in light of the decisions of the 26th CPSU Congress, the June (1983) and subsequent CPSU Central Committee plenums, Academician of the Armenian SSR Academy of Sciences B. Arakelyan, academician secretary of the department, noted in his report. Among the most important achievements of Armenian scientists is the formulation of the comprehensive program of the scientific and technical progress of the Armenian SSR for 1986-2005, which the Institute of Economics carried out in cooperation with institutions of economic science of the republic. The academic edition of the eight-volume "Istoriya armyanskogo naroda" [History of the Armenian People], in which a picture of the history of the Armenian people and the achievements of modern life is given, was completed.

In the research a special place was devoted to the study of the peculiarities of the present stage of the economic and social development of our country, particularly Soviet Armenia, to the elaboration of the problems of improving mature socialist society, the history of the Communist Party, the comprehensive coverage of urgent questions of theory and practice and the establishment of their specific importance, placing all this at the service of the communist education of workers and the formation of their active position in life.

A number of scientific works, which are a direct response to the tasks posed by the June (1983) CPSU Central Committee Plenum and the June Plenum of the Armenian CP Central Committee, were prepared for publication by the forces of the Philosophy and Philology Department.

Concerning the most important results of the activity of the institutions of the department for the year under review, Academician of the Armenian SSR Academy of Sciences G. Brutyan, academician secretary of the department, told about the work that had been done and about the tasks for the future.

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CSO: 1814/170

ANNUAL GENERAL ASSEMBLY OF MOLDAVIAN SSR ACADEMY OF SCIENCES

Kishinev SOVETSKAYA MOLDAVIYA in Russian 12 Apr 85 p 3

[Article by ATEM correspondents V. Malikova and R. Khomenko: "The Annual General Assembly of the Moldavian SSR Academy of Sciences"]

[Text] The urgent problems of the acceleration of scientific and technical progress and the strengthening of the contact of science with production for the purpose of its maximum involvement in the changeover of the economy to the intensive means of development were discussed at the annual General Assembly of the Moldavian SSR Academy of Sciences, which was held on 11 April in Kishinev. Its participants expressed thorough satisfaction with the decisions of the March CPSU Central Committee Plenum, which demonstrated the invariability of the strategic line of the party and its policy of the transformation of the material and technical base of production, the improvement of the system of social relations and the qualitative improvement of the living and working conditions of the Soviet individual.

President of the Moldavian SSR Academy of Sciences A. A. Zhuchenko, an academician of it, who delivered the report "The Tasks of the Moldavian SSR Academy of Sciences on the Acceleration of Scientific and Technical Progress in the National Economy of the Republic," opened the assembly. General Secretary of the CPSU Central Committee Comrade M. S. Gorbachev, he said, stressed once again the need to bring all the sectors of the national economy in a short time up to the leading levels of science and technology and to ensure its decisive changeover to the path of intensive development. All this requires the significant improvement of the organization of the entire system of scientific research, the concentration of the scientific potential on the key national economic tasks and the extensive and rapid introduction in production of the achievements of science and technology. Here special tasks face the scientists of the academy, who are called upon to make in production truly revolutionary changes and to ensure the leading increase of basic research, which is capable of suggesting fundamentally new types of equipment and technologies and of increasing labor productivity by tens and hundreds of times.

The fact that in the system of the Republic Council for Coordination academic institutions are in charge of 14 of the 15 intersectorial scientific and technical problems, characterizes the increased role of the republic academy

in the coordination of the research being conducted by all the scientific institutions of Moldavia. The strengthening of their contacts with production was also ensured by the implementation of the academy-wide comprehensive program of assistance to the national economy, within which contact with 19 ministries and departments of the republic is being ensured, by means of contracts on scientific cooperation with 270 enterprises of the republic and country, cooperation on the basis of joint scientific and technical programs and economic contracts, the establishment of intersectorial scientific subdivisions and so on.

All this made it possible to increase the effectiveness of academic science. Fundamentally new results, which are important for the national economy, were obtained in the area of the study of the natural resources of Moldavia and their efficient use, the elaboration of adaptive principles of the intensification of agriculture, the development of new materials, technological processes, instruments and devices and the improvement of the management of economic and social processes. Among the most important operations is the introduction on a union scale of a synthetic medium for the cryogenic preservation of the sperm of agricultural animals, the efficiency of which exceeds all the similar media known in the world, units for the electric-spark hardening of metal, the electric treatment of plant raw materials and the electric plasma cutting of metal and technological lines for the application of powdered polymer coatings, paints and varnishes with the use of electric fields.

The tasks of the Academy of Sciences for the coming period are connected with the prospects and peculiarities of the intensification of the national economy of the republic. Along with the solution of the problems of the further development of the agroindustrial complex scientists have to devote foremost attention to the problems of the efficient and optimum development of the fuel and power complex of the republic and, first of all, its electric power systems, large-scale land reclamation and hydroeconomic construction, as well as industry.

Having stressed the need for the comprehensive, interconnected solution of these problems on both the scientific and practical levels, the speaker noted the particular importance of the research, which is setting as its goal the development of resource- and energy-saving technologies, as well as environmental protection.

The scientists of the Power Cybernetics Department should deal more with the questions of the increase of the effective operation of the republic power system, the improvement of its maneuverability, reliability and quality and the further development and improvement of generating capacities. The new insulating components, which have been developed here and make it possible to decrease the expenditures of materials and the losses of power, as well as to use land more economically, should obtain greater practical use.

In connection with the fact that in the next 15 years it is envisaged to increase the share of industry in the structure of the national income to 65 percent, the technical and physical sciences and the utmost strengthening of the contacts of the academy with the leading enterprises of the republic

should undergo further development. The problems of the development and introduction of versatile automated systems of robotics and microelectronics and the development of electronic and construction materials require special attention.

A reproach meant for the ministries and departments of the republic, which are using poorly the already obtained results, was heard. This, in particular, concerns the use of units like the Elitron for the electric-spark alloying of the surface of metal and units like the Plazmoliz, which make it possible to increase significantly the yield of juice in case of the processing of the products of plant growing.

In speaking about the participation of scientists in the solution of the priority and long-term problems of the comprehensive development of land reclamation in the republic, the speaker pointed out the need for the significant intensification of research on these problems in the system of the Moldavian SSR Ministry of Land Reclamation and Water Resources, at the Moldavian Scientific Research Institute of Irrigated Farming and Vegetable Growing of the Dnestr Scientific Production Association and at such sectorial scientific production associations as the Selektsiya, Gibrid, Viyerul and Kordu associations.

The changeover of agricultural production to a qualitatively new basis, he stressed, requires not only the successful settlement of individual, special issues, but also the elaboration of fundamentally new approaches in the agroclimatic macroregionalization and microregionalization of territories, land management, selection, strain testing, seed growing, the designing of agrocenoses, systems of protection and so on. Having intensified the research in these directions, scientists have to proceed to its more extensive checking under the conditions of farms, and in the future on the scale of the entire system of the agroindustrial complex. With allowance made for the importance of the Food Program an interdisciplinary approach to its problems is becoming more and more necessary.

Concerning the tasks of social scientists, the speaker indicated the need for the increase of the efficiency of their work in light of the decisions of the June (1983) CPSU Central Committee Plenum--the changeover from the statement of socioeconomic problems, which predominates at present, to the forecasting of social processes and trends and the elaboration of recommendations for practical activity. The writing of major conceptual works, in which the most urgent problems of the spiritual and material culture of the Moldavian people from ancient times to our day would find coverage and would receive interpretation from a Marxist-Leninist standpoint, in the future should also be regarded as a main task of the academy. It is obvious that a high level of the preparation of textbooks and teaching aids for schools and higher educational institutions and the great effectiveness and quality of propaganda and counterpropaganda can be ensured only on the basis of such works.

Academician of the Moldavian SSR Academy of Sciences A. M. Andriyesh, chief scientific secretary of the Presidium of the Moldavian SSR Academy of Sciences, delivered the accountability report on the activity of the Moldavian SSR Academy of Sciences in 1984.

At the scientific institutions of the academy, he said, basic research was conducted on 82 problems of the natural and social sciences. A significant portion of the themes were completed on the instructions of the USSR State Committee for Science and Technology, as well as within the framework of cooperation with foreign countries. During the period under review more than 150 developments were introduced in the national economy with a total economic impact of more than 88 million rubles. Of them the collectives of the academy account for 45 million rubles. The Republic Coordinating Council, which is headed by the academy, is directing the efforts of more than 3,000 associates of the Moldavian SSR Academy of Sciences, higher educational institutions, sectorial scientific research institutions, scientific production associations and production associations. They are engaged in the elaboration of the 15 most important scientific and technical programs for the republic. The cooperation on interrepublic problems, which are being solved in collaboration by the Belorussian, Ukrainian and Moldavian academies of sciences, is also being extended.

The speaker analyzed the activity of the problem councils on the fulfillment of the assignments of the five-year plan and the concentration of the efforts of scientists on the acceleration of scientific and technical progress. In particular, mathematical models and algorithms, which are contributing to the solution of the problems of motor transport and food enterprises of the republic, were elaborated. The research of physicists in the area of semiconductor materials was marked with success. The authorship of a technology of obtaining indium phosphide, which is promising for elements of integrated circuits, belongs to them. The scientific research on superconducting, thermosensitive, optical electronic and other materials, which the electronics industry needs, was developed extensively. Unique magnetic crystals and a number of precision recording and measuring instruments, which are already being used in the national economy, were developed.

More than 70 coordination compounds, which are valuable for medicine and agriculture, light, the food and other sectors of industry, were synthesized at the academy. A number of advanced technologies, which increase the reliability and durability of equipment, including agricultural machines and devices, were developed. The discovery by geologists of deposits of nonmetallic mineral resources in Moldavia will play great importance for local industry and the production of construction materials.

In speaking about the research in the area of power engineering, the speaker noted among the completed research the program complex of the optimization of the operating conditions of thermal electric power plants, the automated system of reclamation water supply with controlled-velocity electric drive and recommendations on the use of lines of increased capacity.

The chief scientific secretary devoted special attention to the developments which are aimed at the implementation of the Food Program. The basic efforts here are concentrated on the increase of the stability of agricultural production, its energy efficiency and nature conservation. Basic research on fundamentally new methods of selection has been launched within the comprehensive program "Adaptation." The mechanisms of the adaptation of

agricultural plants to extreme conditions of cultivation--drought, frost and increased salinity--are being developed. Serious importance is being attached to the prevention of environmental pollution under the conditions of the intensive chemicalization of farming.

Information on the development in Moldavia of advanced methods of the storage and transportation of agricultural products and on the contribution of zoological scientists and economists to the solution of the problems of the Food Program was cited in the report. Important and useful work was done on the problem "The Regional Economic Forecast": a comprehensive program of the scientific and technical progress of the Moldavian SSR for 1986-2005 and plans of the development and distribution of the productive forces of the republic for 1986-2000 were formulated.

The preparation of the multivolume "Istoriya Moldavskoy SSR" [History of the Moldavian SSR], the publication in Moldavian and Russian of the one-volume "Istoriya Moldavskoy SSR" and the publication of a series of monographs, school textbooks and programs on the history of the Moldavian SSR for higher educational institutions and schools were a substantial result of the work of social scientists. The preparation and publication of the collective monograph "Sotsialno-istoricheskaya obuslovnost razvitiya moldavskogo natsionalnogo yazyka" [The Sociohistorical Dependence of the Development of the Moldavian National Language] and a number of scientific pamphlets and the preparation of the one-volume word book "Svoda pamyatnikov istorii i kultury Moldavskoy SSR" [A Collection of Monuments of the History and Culture of the Moldavian SSR] were carried out.

Nevertheless, the activity of a number of scientific councils and sections needs serious improvement, the chief scientific secretary noted. It is necessary to strengthen their coordinating role, they should influence more actively the planning of the scientific themes of the chairs of higher educational institutions and the collectives of sectorial scientific research institutes. The work on the automation of scientific research with the use of computer equipment requires further development.

The speakers and those who addressed the assembly noted that not all the subdivisions of the Moldavian SSR Academy of Sciences are working at a high scientific level. They are inadequately concentrating forces on the urgent directions of basic research, several of them are not having an appreciable influence on the acceleration of scientific and technical progress in the sectors of the national economy of the region.

Criticism meant for scientists, whose works do not have an appreciable influence on the sociopolitical life of the republic, was heard from the rostrum of the assembly. It was noted that the direct duty of social scientists is on the basis of Marxist-Leninist methodology and a thorough analysis of the trends and problems of social development to furnish party and state organs with ideas, concepts and recommendations, which help to manage socioeconomic and spiritual processes more efficiently. They should give a timely and well-reasoned rebuff to hostile fabrications, reflect more thoroughly the friendship and fraternity of the Moldavian and Russian peoples,

all the Soviet peoples and reveal more convincingly the great advantages of socialism.

Much attention was devoted to the problems of the introduction of completed scientific developments. Examples of the conservative attitude of production organizers toward the recommendations of science were cited. Thus, the already mentioned Plazmoliz units for the processing of plant raw materials, which were developed at the Institute of Applied Physics of the academy, have found practical use at enterprises of the food industry of the USSR and in a number of foreign firms, but they are not being used in our republic. A technology of renovating the cooling systems of fruit and vegetable storehouses, which makes it possible to reduce the consumption of electric power and to increase the useful area of storehouses, was developed at Kishinev Polytechnical Institute, but it has been introduced only in Strasheny and Drokiya.

At the assembly the following paradoxical fact was also cited: the Ministry of Land Reclamation and Water Resources, the Ministry of Highway Construction and Maintenance and the Ministry of Agriculture of Moldavia specified the need for units for electric-spark alloying, which have gained extensive popularity, in the amount of one unit, while a number of USSR ministries have set up their series production for the needs of their own sectors. Less than 5 percent of the economic contractual operations, which are performed by scientific institutions of Moldavia, are ordered at the level of its ministries and departments. As before, more than 40 percent of the contracts are concluded outside the republic.

Such a situation must not be tolerated, it was stated at the assembly. It is necessary to increase the responsibility of ministries and departments for the large-scale introduction of completed research and the responsibility of scientists for the bringing of developments up to the corresponding standards of modern production, to the stage of the preparation and making of production prototypes.

The organizers of science and planning organs must continue the search for forms of the integration of science with production and the concentration of scientific forces on the solution of the most important problems, displaying in so doing greater initiative, persistence and consistency. The need for the improvement of personnel policy at institutions of the academy was indicated in a number of statements.

The assembly participants gave assurances that the collective of the Moldavian SSR Academy of Sciences would direct all their creative efforts at the successful completion of the plan assignments of the 11th Five-Year Plan, the implementation of the achievements of basic science in the practice of mature socialist society and the fulfillment of the decisions of the Communist Party and the Soviet Government on the acceleration of scientific and technical progress and the worthy greeting of the 27th CPSU Congress and the 16th Moldavian CP Congress.

The scientific reports of Academician of the Moldavian SSR Academy of Sciences Kh. G. Korbu on Moldavian literature during the years of the Great Patriotic

War, of Corresponding Member of the Moldavian SSR Academy of Sciences I. F. Klistorin on microprocessors and automated systems based on them and of Corresponding Member of the Republic Academy of Sciences A. F. Ursu on the regional laws of the ecology of soils were heard.

The election of members of the Presidium of the Moldavian SSR Academy of Sciences in place of those who left and the presentation of awards to the winners of competitions and socialist competition in the system of the republic Academy of Sciences were held.

First Secretary of the Moldavian CP Central Committee S. K. Grossu delivered a speech to the assembly participants.

Secretary of the Moldavian CP Central Committee P. P. Petrik and Deputy Chairman of the Moldavian SSR Council of Ministers N. P. Kiriyak took part in the work of the annual General Assembly of the Moldavian SSR Academy of Sciences.

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SYMPOSIUM ON LUMINESCENT DETECTORS, IONIZING RADIATION CONVERTERS

Tallinn SOVETSKAYA ESTONIYA in Russian 25 Apr 85 p 2

[Article by Candidate of Physical Mathematical Sciences G. Khyutt, senior scientific associate of the Institute of Geology of the Estonian SSR Academy of Sciences: "Luminescence Serves"]

[Text] The 5th All-Union Symposium on Luminescent Detectors and Ionizing Radiation Converters has concluded in Tallinn. The General Physics and Astronomy Department of the USSR Academy of Sciences, the Institute of Geology of the Estonian SSR Academy of Sciences and Tartu State University organized it.

As is known, along with electronics and illumination engineering, radiation physics is among the most important areas of the use of luminescence. Industry, medicine and science use its methods. The need for the detection of invisible emissions and the obtaining of visible images and the assurance of the radiation safety of personnel, patients and the population as a whole are also connected with the development of atomic energy.

That is why, starting in 1973, all-union symposiums with the participation of not only specialists in luminescence and phosphors, but also developers and researchers of the corresponding instruments are held every 3 years under the aegis of the USSR Academy of Sciences and its Scientific Council for Luminescence.

In all 230 specialists from Moscow, Tallinn, Tartu, Riga, Leningrad, Irkutsk, Stavropol, Lvov, Kharkov, Sverdlovsk, Tomsk and other cities participated in the current symposium. A record number of reports (160!)--fourfold more than at the first symposium in Moscow--were on the program. Moreover, there were thematic discussions on the problems "The Laws of X-Ray Luminescence, Radioluminescence and Thermoluminescence and Their Connection With the Structure of Phosphors," "Luminescent Means of Dosimetry" and "Luminescent Converters of an X-Ray Image."

The method of thermoluminescent dosimetry--one of the most sensitive, precise and reliable means of estimating the level of radiation exposure--was one of the aspects of the conference. Such estimates are necessary in case of

individual dosimetry in medicine, the measurement of background natural radiation, monitoring at reactors, nuclear electric power plants and so on.

Both the latest achievements in the area of research and the prospects of the industrial production of dosimetric complexes were discussed at the symposium.

The scientific research and development in the area of X-ray screens, which are used in medicine, were also discussed. Highly sensitive, sufficiently contrasting screens (the imagine is provided by a specially applied layer of phosphor) decrease the radiation load on patients and physicians during the examination procedure. New technological developments have been proposed. A number of works, which were devoted to luminescent detectors for computer tomography--a new highly sensitive method of X-ray diagnosis--were presented for the first time.

And, finally, the results of basic research, which concerns the mechanisms of the interaction of radiation with matter, and of the nature of luminescent materials were the subject of interested discussions.

Scientists of Estonia for more than 30 years now have been making their contribution to the development of luminescence and its use. Extensive research on both basic and applied problems of luminescence is being conducted at Tartu University, the Institute of Physics of the USSR Academy of Sciences, the Institute of Geology of the Estonian SSR Academy of Sciences and Tallinn Polytechnical Institute.

In the decision of the symposium there were noted, in particular, the considerable progress in the area of the use of the thermoluminescence of natural minerals for the determination of the age of geological and archeological objects--a direction being developed by the Institute of Geology of the Estonian SSR Academy of Sciences, as well as the successes of scientists of the Chair of Analytical Chemistry of Tartu State University, which are connected with the development of dosimetric phosphors.

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BRIEF

SCIENTIFIC PROGRESS, LABOR PRODUCTIVITY--(ETA)--The All-Union Applied Science Conference "Scientific and Technical Progress and Labor Productivity at Enterprises" began on 9 April in Tallinn. Candidate Member of the Buro of the Estonian CP Central Committee and First Deputy Chairman of the Estonian SSR Council of Ministers I. Toome opened the conference. In greeting the conference participants, he said that the improvement of the economic mechanism and the system of management of the production sphere is a vital task of scientists and specialists of all areas of the national economy. The strategic policy, which was elaborated at the 26th party congress and the subsequent CPSU Central Committee plenums, is aiming us at the elaboration of practical recommendations on the acceleration of scientific and technical progress. Reports, the viewing of documentary films, the visiting of enterprises of the city of Tallinn, as well as the compilation of a summary of practical advice to the developers and managers of scientific and technical programs are on the program of the conference. Academician of the USSR Academy of Sciences A. Aganbegyan, chairman of the United Scientific Council for Economic Sciences of the Siberian Department of the USSR Academy of Sciences, and Academician of the Estonian SSR Academy of Sciences A. Keyerna, vice president of the Estonian SSR Academy of Sciences, are taking part in the work of the conference. [Text] [Tallinn SOVETSKAYA ESTONIYA in Russian 10 Apr 85 p 3] 7807

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GENERAL

UDC 061.6.003.13

BOOK ON WORK EFFICIENCY OF RESEARCH INSTITUTES, DESIGN BUREAUS

Moscow MASHINOSTROITEL in Russian No 2, Feb 85 p 29

[Review by Candidate of Economic Sciences S. L. Sterkin of book "Kompleksnyy analiz effektivnosti raboty NII i KB" [The Comprehensive Analysis of the Efficiency of the Work of Scientific Research Institutes and Design Bureaus] by Doctor of Economic Sciences Professor A. K. Kazantsev, Mashinostroyeniye, Leningradskoye otdeleniye, Leningrad, 1983, 216 pages: "The Comprehensive Analysis of the Efficiency of the Work of Scientific Research Institutes and Design Bureaus"]

[Text] Among the problems of the management of scientific and technical progress, which for the present have not found an acceptable solution in theory and practice, the questions of the evaluation of the activity of scientific, design and technological organizations, first of all organizations of the sectorial type, stand out. The book of Doctor of Economic Sciences Professor A. K. Kazantsev "Kompleksnyy analiz effektivnosti raboty NII i KB" [The Comprehensive Analysis of the Efficiency of the Work of Scientific Research Institutes and Design Bureaus]¹ is devoted to precisely these urgent questions.

The author shows the peculiarities of scientific and technical organizations as an object of economic analysis, studies the nature of the use value of the product of sectorial science and gives a classification of its goals, as well as a modern theoretical idea of the essence, subject and methods of the economic analysis of scientific and technical organizations of the applied type (NTO's).

In the book the systems approach to the process and object of analysis, the integral methodology of its interconnected types, the analyzed indicators and the methods of their interpretation and the indication of the specific objects of study, the sources of information, the periodicity, the subjects of analysis, the procedure of data processing and the use for use of modern equipment--mathematical economic methods and computers--are most interesting.

The book is based, first of all, on abundant material of the economic analysis of the activity of scientific and technical organizations of the machine building type: the electrical equipment industry, the sectors of heavy

transport and power machine building, a number of machine building ministries, Leningrad scientific research institutes and design bureaus.

On the basis of the goals, content and problems, the author distinguishes the long-range and the day-to-day economic analyses and cites the methods of modeling problems and the body of mathematics, which are specific to them. The comprehensive economic analysis of the results of the activity of scientific research institutes and design bureaus, which should become the basis for the elaboration of optimum management decisions, is an analytical tool, which makes it possible to study all the components of the scientific production processes occurring in scientific and technical organizations, the external and internal aspects, the resources and their use, the results of activity and the connection with the consumed resources and the economics of industrial production.

The theoretical assumptions, on which the author bases the integral system of economic analysis, which was introduced by him, is supported by a carefully worked out system of the analytical study of all the aspects of the activity of scientific research institutes and design bureaus, their common characteristic, the scientific potential, the indicators of the fulfillment of the plan assignments, the quality of research and development and the economic results of the activity of the organizations. The components of the "input" of the system, which previously did not undergo study in a unified complex with the results obtained at its "output," as well as the end results of the work of scientific and technical organizations, among which are, for example, the system of management of scientific research institutes and design bureaus, the technical and economic indicators of production in the sectors in interconnection with the structure of the plan and with the personnel and information component of the scientific potential and the social results of the activity of scientific and technical organizations, are covered by the analysis.

A number of assumptions of the author on the interpretation of individual indicators, their place and nature of dynamics should be considered debatable. The danger of applying to the work of scientific research institutes and design bureaus the stereotype evaluations, which have been adopted when analyzing the industrial production activity of enterprises, is repeatedly stressed in the work. At the same time the author often exaggerates the importance of value indicators and carries the methods of their calculation, which have been adopted in industry, over to the sphere of science. This applies, for example, to the indicators of labor productivity and the output-capital ratio at scientific research institutes and design bureaus (pp 95, 103-106, 114-115 and others). The point is that the amount of the expenditures on research and development, the magnitude of which depends little on the amount of work being performed, its complexity and the productive force of the labor of specific workers, appears in place of "the value of the product" of scientific and technical organizations, which would be determined by means of relatively stable measurers (for example, prices). Its magnitude, first of all, is a function of the numerical composition of the organization and the expenditures on wages.

The individual cost of separate scientific research operations, which we are forced to take as the socially necessary expenditures on their performance, is determined immediately before the performance of these operations and is the outlays on the pay of the collective of workers during a specific period of time, as well as the expenses for materials and the supply, service and management of the organization as a whole. Thus, if the duration of the development of new equipment is cut in half, the cost of the elaboration of a theme is reduced by approximately the same amount or a little less. And vice versa. The indicator of the "output," which was determined on the basis of the cost, does not reflect the real labor productivity of workers in the sphere of science: in case of the creation in a unit of time of a different quantity of real objects of equipment the indicator of the output practically does not change.

The same thing can be said about the "value" approach to the measurement of the output-capital ratio at scientific research institutes and design bureaus. In our opinion, the decline of this indicator characterizes significantly more the increase of the equipment of labor, the technical potentials of the organizations and their scientific potential than the decrease of the yield from invested resources, that is, such dynamics as a whole is more of a positive than a negative nature. The dynamics of the increase of the value of productive capital in the sphere of science should be analyzed together with the dynamics of the increase of the economic impact from the development of equipment. Here it is necessary to take into account a certain shift of the dynamic series, for the results of additional capital investments in the fixed capital of scientific organizations will appear only after some interval of time. In this connection the thesis that "the average annual output per worker, which is calculated in the estimated cost of the operations, is the most general indicator of the productivity of research and design labor" (p 103) seems erroneous.

In the book there are a number of discrepancies, which are especially regrettable as it as a whole can be used as the methods handbook for workers of the system of management in case of the analysis and evaluation of the activity of scientific research institutes. It is possible to group with them: the poor numerical examples in tables 3.9 and 3.12 (pp 128 and 137), the unconventional construction of the formula for the calculation of the growth rate of indicators (p 131), the vagueness of the definition of the indicator of expenditures in case of the calculation of efficiency (p 176) and others.

However, in spite of these discrepancies and the debatable nature of individual assumptions of the author, the book under review is of interest for scientists, who are studying the problems of the management of scientific and technical progress, as well as for workers of scientific research institutes, ministries and departments, who are concerned with the problems of the evaluation of the activity of scientific and technical organizations of the sectorial type.

FOOTNOTE

1. A. K. Kazantsev, "Kompleksnyy analiz effektivnosti raboty NII i KB" [The Comprehensive Analysis of the Efficiency of the Work of Scientific Research Institutes and Design Bureaus], Leningrad, Mashinostroyeniye, Leningradskoye otdeleniye, 1983, 216 pages.

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